



# Queenstown Lakes District Council Shotover Wastewater Treatment Plant Recreation Assessment



FINAL

Figure 1: Kawarau River proposed discharge location looking downstream

# Prepared for Queenstown Lakes District Council

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## Abbreviations and definitions

<b>95<sup>th</sup> percentile</b>	95% of measurements lie below the number referred to
<b>Cfu/100ml</b>	Colony forming units per 100 millilitres
<b>CMS</b>	Conservation Management Strategy
<b>DHB</b>	District Health Board
<b>DOC</b>	Department of Conservation
<b>EOC</b>	Emerging organic contaminants
<b>L/s</b>	Litres per second
<b>MfE</b>	Ministry for the Environment
<b>MoH</b>	Ministry of Health
<b>MPN/100ml</b>	Most probable number per 100 millilitres
<b>NOAEL</b>	No observable adverse effects level
<b>NPS-FM</b>	National Policy Statement for Freshwater Management
<b>ORC</b>	Otago Regional Council
<b>PORPS</b>	Proposed Otago Regional Policy Statement
<b>PDP</b>	Proposed District Plan
<b>QMRA</b>	Quantitative Microbial Risk Assessment
<b>QLDC</b>	Queenstown Lakes District Council
<b>RPWO</b>	Regional Plan: Water for Otago
<b>Sup</b>	Stand-up paddle (boarding)
<b>UV</b>	Ultraviolet light, used to disinfect treated wastewater
<b>WCO</b>	Water Conservation Order (Kawarau ) 1997
<b>WWTP</b>	Shotover Wastewater Treatment Plant

# 1 Executive Summary

Queenstown Lakes District Council (QLDC) is intending to establish a long-term treated wastewater disposal solution for the Shotover Wastewater Treatment Plant (WWTP), which serves the wider Queenstown urban area. The existing disposal field on the Shotover Delta has failed and been decommissioned. Treated wastewater is currently being discharged on an emergency basis to the Kimi-ākau/Shotover River under section 330 of the Resource Management Act 1991 (RMA). The proposed long-term solution is to discharge the treated wastewater into the Kawarau River just upstream of Shotover confluence and at the southern eastern end of the Otago Regional Council's flood protection training line. The treated wastewater has the potential to adversely affect recreation opportunities by introducing pathogens into the riparian and river environments. The discharge structure and pipe has the potential to adversely affect recreation opportunities in the riparian and river environments.

This report:

- Describes the recreation values of the study area shown in Figure 6;
- Identifies the relative values of recreational use of each part of the study area (Table 3); and
- Considers the effects:
  - of additional treatment capacity at the Shotover WWTP and the continued but improved discharge from the WWTP at Shotover confluence into the study area; and
  - on recreation use in river and on the riparian margins within the study area of the discharge structure and pipe.

The human health effects considered in this assessment relate to, primarily, meeting water quality standards across two categories of recreational exposure:

- Primary recreation contact: water contact recreation where swallowing water is likely, such as during swimming; and
- Secondary recreation contact: where contaminated water can be aerosolised and inhaled or enter the body via a cut, such as while jet boating or during riparian activities such as fishing.

The assessment also considers effects on fish species which are taken recreationally, and effects on recreation access within the study area and at the outfall structure at the Kimi-ākau/Shotover River delta.

For the purposes of this consent application, the existing environment:

- Includes the present human disturbances and modifications to the environment within the study area including the Shotover WWTP, flood protection works (especially the training line), and the extensive urbanisation of surrounding areas.
- Includes the past effects of the activity. That is, the extent to which the receiving environment may have already been altered by the operation of the WWTP up to the present time, including documented non-compliance events to the Kimi-ākau/Shotover and Kawarau Rivers and the ongoing groundwater discharges from the DAD field;

- Does not include the ongoing effects of the activity which is the subject of this resource consent application.

There are a range of recreation activities within the study area. All activities are assessed as having regional significance, with the Queenstown Great Ride and commercial Jetboating having high recreation value and the remaining recreation activities having moderate to low recreation value at most, with Shotover Jet and the Queenstown Great Ride considered nationally significant.

#### *Human Health effects*

Following the October 2025 treatment upgrade, treated wastewater consistently shows low or non-detectable E. coli levels. Critically, upstream monitoring at the Shotover River (RS04B) regularly recorded higher E. coli concentrations than the treated wastewater between January and May 2026, demonstrating that diffuse catchment sources, including runoff, stock access, wildlife, and bird activity, are a stronger driver of downstream water quality than the WWTP discharge. Downstream at RS10 and upstream at RS14, both sites fall within the NPS-FM "Excellent" category for primary contact recreation.

Predicted E. coli concentrations within the immediate near-field mixing area and after reasonable mixing are well within the National Policy Statement for Freshwater Management (NPS-FM) national bottom line (540/100ml) and the Regional Plan for Water for Otago 80<sup>th</sup> percentile limit (260/100ml). The NPS-FM national bottom line for primary contact bathing sites falls within the NPS-FM A band for human contact and infection risk (i.e., suitable for swimming). The quantitative health risk assessment concludes that infection risk from Campylobacter and norovirus for swimmers and other recreationists is low and acceptable. Proposed tertiary filtration and additional UV disinfection upgrades are expected to reduce residual infectious pathogens significantly below these limits, providing a high level of confidence in ongoing pathogen management.

The NPS-FM framework addresses Campylobacter infection risk only, and does not capture overall pathogen risk. From a health risk perspective, a nil risk cannot be claimed, some residual risk will always exist. This assessment characterises the existing risk as low, and the risk associated with the proposed discharge as consistent with that existing baseline. It is acknowledged that the assessment Table 6 assumes the above which represents a conservative starting position.

Health risk effects across all recreation activities are assessed as negligible (Table 1) for both primary and secondary contact, reflecting the very low predicted pathogen concentrations. Within the immediate near-field mixing area, a minor effect is possible for activities involving full or partial immersion, though the likelihood of sustained exposure at this location is low given the nature and distribution of recreational use.

This means that the primary contact recreation attribute band of A<sup>1</sup> (as both "Fair (Shotover) and Excellent (Kawarau) bands fall within the A Band rating) will be maintained

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<sup>1</sup> For at least half the time, the estimated risk is <1 in 1000 (0.1% risk). The predicted average infection risk is 1%

downstream of the discharge on the Kawarau. This grade is considered swimmable according to NPS-FM standards.

#### *Effects on Fish (related to commercial and non-commercial angling)*

Effects on fish habitat and food supply in the vicinity of the discharge structure are expected to be highly localised and minor as noted by Boffa Miskell (2026) in their Ecology Effects Assessment. No measurable effect on fish populations, prey availability, or recreational angling habitats is anticipated at the reach or catchment scale.

#### *Effects on Access and the discharge structure*

For the Shotover WWTP, the design of the rock outfall does not inhibit access to the majority of the study area and does not interfere with terrestrial recreation or in river activities such as jetboating or kayaking (see Table 1).

During construction, there is potential for moderate to low disruption to the Great Ride/Twin Rivers Trail and access to shoreline angling and informal watercraft/boat launching points. The construction phase, noted in the AEE, is within the range of 6 to 8 months for the total project time (2-3 weeks for the outfall construction in the river) depending on the Contractor's methodology. With appropriate construction management, including maintained or signposted alternative trail connections and scheduled closures outside peak use periods, effects can be managed to acceptable levels, and are short term. Once operational, effects on access are assessed as low to negligible, provided final design retains existing track connectivity to the Twin Rivers Track and informal walking and cycling tracks adjacent to the Kawarau, and river margin access points with appropriate signage indicating the rock outfall and any potential exclusion zone. If river navigational signage is required, this will be determined following finalisation of designs and consultation with the harbourmaster. The signage will be visible from both upstream and downstream at the outfall, designed to be readable from 5 metres away, and will advise of the presence of a wastewater outfall (see Table 2).

Recommended mitigations include notification to recreation groups of the proposed discharge structure and any temporary exclusion zones, signage at the outfall area, and maintained access to the river delta and Twin Rivers Trail throughout the construction phase. GHD construction-phase mitigations will be incorporated once received.

#### *Cumulative effects*

The study area is subject to a range of existing modifications, as well as the ongoing effects of the current emergency discharge to the Kimi-ākau/Shotover River. The degree to which the WWTP discharge would represent an unacceptable cumulative effect alongside other sources of contamination will depend on the scale and trajectory of those individual sources over time. However, because the WWTP aims to discharge water of superior quality to that currently present in the river, particularly in the Shotover (refer to health risk ratings in Table 6), the proposed discharge is not expected to further degrade the receiving environment, at least until the other existing contamination sources have been effectively controlled.

Considered cumulatively with these existing modifications and disturbances, the minor scale of the discharge structure and pipe, and the minor to negligible human health

effects for recreational users within the immediate near-field mixing area together with negligible effects for users beyond that zone, means that the project will result in negligible additional adverse effects on recreation. Cumulatively with other modifications, the proposal will continue to enable existing recreational use and maintain the existing recreational values of the study area, such that overall recreational use and values will be sustained.

*Overall*

Overall, the proposed discharge, discharge structure and pipe, together with the proposed treatment upgrades and recommended mitigations, is assessed as consistent with the requirements of the NPS-FM, the Regional Plan for Water for Otago, and the Water Conservation (Kawarau) Order 1997 (WCO) in relation to recreation values and human health risk. The scale of adverse effects on recreation values and use within the study area will be minor/negligible within the immediate vicinity of the discharge (immediate near-field mixing area) and negligible beyond. Given the very low level of recreational effects the project will sustain the recreational values of the study area.

**Table 1: Existing significance of recreation activities in the study area at the regional level and level of effect**

Recreation Activity	Health Risk			Discharge Structure and Pipe		
	Recreation Value (Level of Significance (at a regional level))	Magnitude of effect (Primary Contact)	Magnitude of effect (Secondary Contact)	Reasoning (exposure and risk)	Magnitude of effect (structure and access)	Reasoning (discharge structure and pipe)
<b>Jet Boating (commercial)</b>	High	Negligible	Negligible	<p><b>Reasoning (exposure and risk)</b></p> <p><i>Minor risk is defined as reaching a risk attribute band of B from the NPS-FM (for at least half the time, the estimated risk is &lt;1 in 1000 (0.1% risk). The predicted average infection risk is 2%)</i></p>	Negligible	<p><b>Reasoning (discharge structure and pipe)</b></p> <p>While the discharge structure protrudes into the Kawarau River it does so by approximately 3.5% at low flow and up to ~7% during higher flows). Notice of the construction design will be provided to operators, as well as notice of the commencement and duration of construction activities. The effects of the structure itself on commercial jet boating will be negligible.</p>

				mixing area there may be a minor effect. Outside of this zone, the risk of illness would be negligible.		
<b>Jet Boating (non-commercial)</b>	Moderate	Negligible	Negligible	As above.	Negligible	As above.
<b>Swimming (downstream, adjacent to lake hayes)</b>	Low	Negligible	N/A	Swimming involves full immersion and repeated ingestion/inhalation of water, but current levels of use in this particular reach are relatively limited at a regional scale. If swimmers were to swim within the 40m near-field mixing area there may be a minor effect. Outside of this zone, the risk of illness would be negligible.	Negligible	The discharge structure protrudes minimally into the Kawarau River and is located well upstream of the primary swimming area. Swimmers in this reach are unlikely to interact with the structure directly. The risk associated with the structure and pipe on swimming recreation is negligible.
<b>Angling (commercial)</b>	Low	Negligible	Negligible	Guided commercial angling in this area is typically drift fishing from a small vessel. Primary contact with the water is limited and is incidental exposure to ingestion or inhalation of water. Secondary contact is more probable if anglers are	Negligible	The discharge structure does not materially obstruct drift fishing lanes or vessel navigation in this reach. The structure itself may become a hiding area for some fish species which may increase fish

				reaching into the river to grab fish, although most anglers would be well away from the discharge/mixing area. If anglers were to fish within the 40m near-field mixing area there may be a minor effect. Outside of this zone, the risk of illness would be negligible.		populations. Commercial guided anglers operating from small vessels would be well clear of the structure, and notice of construction timing and design will be provided to operators. Effects of the structure on commercial angling are negligible.
<b>Angling (non-commercial)</b>	Low	Negligible	Minor/ Negligible	Non-commercial anglers typically access the river on foot and often wade into shallow margins, resulting in regular wetting of legs and hands and occasional splashing, but with a relatively low likelihood of deliberate or accidental ingestion of water. If anglers were to fish within the 40m near-field mixing area there may be a minor effect. Outside of this zone, the risk of illness would be negligible.	Minor	Non-commercial anglers accessing the river on foot may approach closer to the structure than commercial anglers. Signage will be made clear for anglers not to climb on the structure. However, the structure's footprint is approximately 60m in width along the river's edge at its widest point tapering inland to a narrow 10m in width and anglers can readily avoid it. Some minor interference with preferred wading margins immediately adjacent to the structure is possible,

						hence a low rather than negligible rating.
<b>Angling-fish health (commercial and non-commercial)</b>	Moderate/ Low	Negligible for fish health		Changes to fish habitat and food supply around the structure are expected to be highly localised and minor, with no measurable effect on fish populations, prey availability, or recreational angling habitats at the reach or catchment scale.	Minor	
<b>Whitewater sports (e.g., kayaking, pack rafting)</b>	Moderate	Negligible	Negligible	Participants are on, but not usually in, the water; spray and splash can be frequent at speed, leading to intermittent ingestion or inhalation of water, but current levels of use in this particular section of the reach are relatively limited at a regional scale. If paddlers were to paddle within the 40m near-field mixing area there may be a minor effect. Outside of this zone, the risk of illness would be negligible.	Negligible	The discharge structure protrudes a minor proportion of the river width and is unlikely to create a meaningful hazard for paddlers in this reach. Notice of the structure's location and design will be provided to relevant users. As this is not a primary location for whitewater sports, in comparison to other sections of the river downstream, effects on whitewater recreation are negligible.

<b>Wakatipu Trails Trust (Great Ride/Twin Rivers Trail)</b>	Very High	N/A	N/A	Trail users are adjacent to the river but typically remain on the formed track well setback from the discharge location (approximately 400m), with no expectation or requirement of water contact; the activity is regionally significant but designed as a dry, off-water experience.	Negligible	Given the pipe will be buried and the trail does not intersect with the discharge structure itself, effects are negligible.
<b>River boarding</b>	Moderate	Negligible	Negligible	River boarding involves close proximity to the water but (in this reach) is infrequent at a regional scale;	Negligible	Given the infrequent use of this reach for river boarding and the minor protrusion of the structure into the river channel, the structure is unlikely to present a meaningful navigation or safety hazard. Effects are negligible.
<b>Four-wheel driving, MotoX and Mountain Biking</b>	Low	N/A	N/A	Activities occur on tracks or river terraces, with users remaining in vehicles or on bikes; any water contact is incidental (e.g. splashes when crossing minor fords) and generally avoidable for most participants.	Negligible	These activities occur on tracks and river terraces away from the water's edge. The discharge structure and pipe have no bearing on vehicle or bike access routes in the

						study area. Effects are negligible.
<b>Other terrestrial recreation (e.g., dog walking near the river's edge)</b>	Low	N/A	N/A	Dog walking and other edge-based activities involve incidental splashes or wet feet rather than deliberate water contact. Within a regional context, this is lower value spot than others along Lake Wakatipu and the Arrow River	Negligible	The discharge structure is set within the river channel and does not encroach on the riparian margins used for dog walking or other edge-based activities. Any visual presence of the pipe is minor and localised. Effects are negligible.

**Table 2: Effects on access as a result of the outfall structure**

<b>Stage</b>	<b>Level of effect</b>	<b>Reasoning</b>
<b>Construction</b>	No more than minor	Construction activities (including temporary works areas, machinery access, and possible short-term closures or detours) have the potential to disrupt continuity of the Great Ride/Twin Rivers Trail and to constrain access routes to preferred shoreline angling locations and informal boat launching points.
<b>Operation</b>	Minor	Once operational, the proposal is not expected to materially alter physical access to terrestrial recreation or reduce the ability to access water-based recreation, provided final design maintains existing track connectivity and river access points.

## 2 Introduction

QLDC is establishing a long-term treated wastewater disposal solution for the Shotover WWTP, following the failure and decommissioning of the existing Shotover Delta disposal field. Treated wastewater is currently being discharged on an emergency basis to the Kimi-ākau/Shotover River under section 330 of the RMA.

The preferred long-term disposal option is for a discharge of treated wastewater to the Kawarau River. The discharge will be conveyed via approximately 1.35 km of underground pipeline from the WWTP to the outfall point (Figure 2). The proposed outfall design<sup>2</sup> extends the structure approximately 10 m into the river, placing its base roughly 1 m below low-flow level where the shallow margin ends and the faster main channel begins (Figure 3). A 10-metre-wide boulder cover would protect the channel from erosion. The structure would taper back into the riverbank with rock “wings” that guide river flow past the discharge at a shallow angle, reducing back-eddies and visual prominence (Figure 4).

Additional rockwork and planting are methods that are being explored at the outfall to blend it into the landscape and discourage public access (Figure 5). However, the outfall site is not dependent on the above for visual mitigation. The outfall is sized to accommodate long-term population growth, with peak discharge volumes projected to reach 60,000 m<sup>3</sup>/day by 2060.

Prior to discharge, treated wastewater will pass through tertiary filtration to reduce suspended solids, solids-bound organics, and nutrients, improving the quality of treated wastewater currently discharged. The tertiary filtration follows the existing treatment process, which includes Modified Ludzac-Ettinger (MLE) biological reactors, clarifiers, sludge treatment, and UV disinfection. The option includes an additional enhanced UV disinfection treatment for higher virus removal efficiency. Stormwater and other waste streams are managed separately and will not be discharged via this outfall.

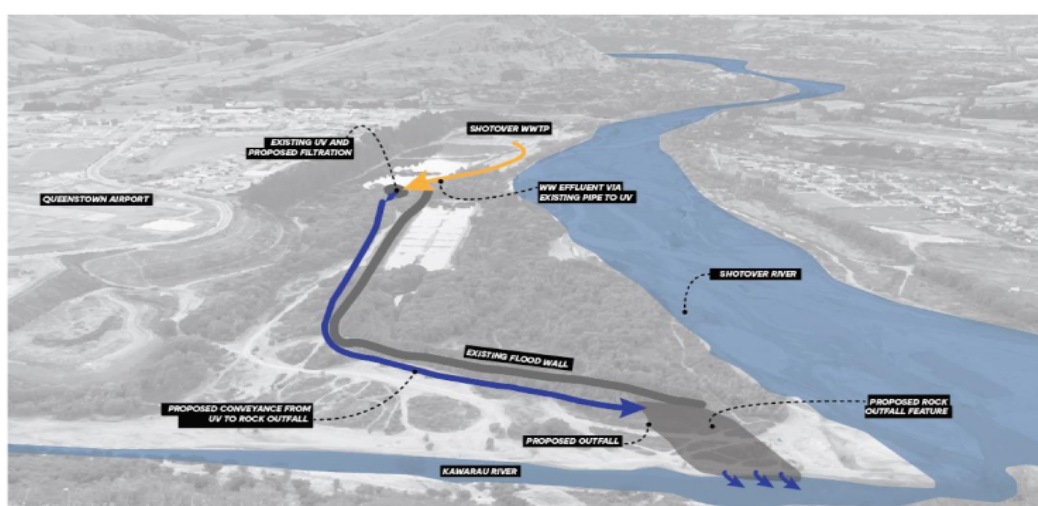


Figure 2: Indicative outfall path from the WWTP to the Kawarau River

<sup>2</sup> In reference to the current concept in the AEE. The design will be further refined through detailed design.

The discharge point is located within the reach of the Kawarau River and lower Kimi-ākau/Shotover protected by the Water Conservation (Kawarau) Order 1997 (WCO). This requires that both the Kimi-ākau/Shotover River and the Kawarau River be managed to Class CR (contact recreation) standard, maintaining contact recreation quality for swimming and wading. The treated discharge has the potential to adversely affect recreation opportunities by introducing pathogens into the river environment, affecting the ability and willingness to recreate in the study area, or to consume or handle trout. The outfall structure may also impede recreation access.

### Extent of Structure

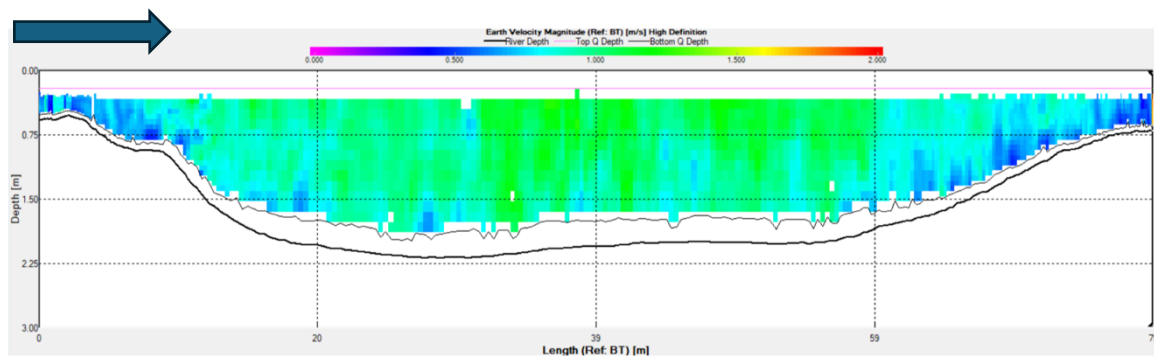


Figure 3: Riverbed Depth and approximate structure length (supplied by GHD (2026))



Figure 4: Current prelim design plan for pipe realignment and rock outfall into the Kawarau (supplied by GHD (2026))

## LANDSCAPE MITIGATION PLANTING PLAN



Figure 5: Preliminary rock outfall design and landscape mitigation planting (supplied by Boffa Miskell (2026))

## 2.1 Method

This assessment is based on:

- A site visit to identify treatment options and components of the study area (the author of this report lives in the QLDC);
- Literature review ([Appendix 1](#) and [Appendix 2](#));
- Thirteen interviews with recreational users of the study area and special interest groups. A summary is provided in [Section 7](#) and more detailed responses can be found in [Appendix 4](#).
- Review of parallel technical reports, particularly:
  - Boffa Miskell. (2026). *Shotover WWTP Landscape & Natural Character Assessment*. Report prepared for QLDC.
  - GHD. (2026). *Shotover WWTP Surface Water and Groundwater Assessment Review of draft assessment findings with the project team*. Report prepared for QLDC.

- GHD. (2025). *Short List Report. Shotover WWTP Disposal Field Alternative Discharge*. Report 12645246 prepared for QLDC.
- Boffa Miskell. (2026). *Shotover WWTP Ecological Impact Assessment*. Report prepared for QLDC.

## 2.2 Study area

The study area for this recreation assessment is defined by the potential measurable effects of the discharge based on GHD’s (2026) hydrodynamic modelling of virus concentration dilution patterns and the probability of human health risk. The area is limited to the immediate riparian and in-river recreation setting. This includes the Twin Rivers Track/Queenstown Great Ride 1 km downstream of the State Highway 6 bridge – where the proposed underground pipe will start – to the Kawarau River, and approximately 1 km either side of the Kimi-ākau/Shotover/Kawarau River confluence (Figure X).

Within this study area, both primary contact recreation (such as swimming), or where full body immersion is likely ( e.g., kayaking, and rafting) and secondary contact recreation (such as fishing, walking, and boating, where incidental contact with water may occur) are considered. In addition, terrestrial recreation locations in the vicinity are included, as access to these may be affected during the construction and operation of the proposed discharge infrastructure. For context, the main forms of recreation occurring in and along both rivers are summarised in [Section 6](#).

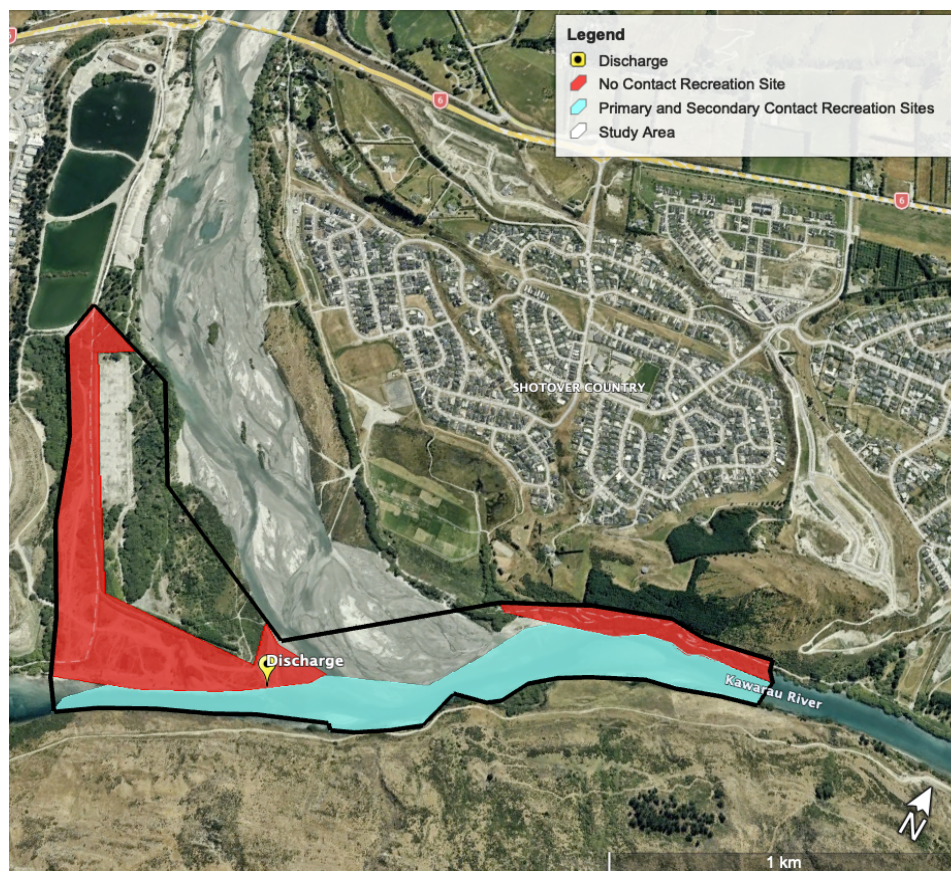


Figure 6: Study area and relative levels of recreation use

### 3 Scope of the assessment and relevant planning matters

This section reviews the planning provisions which identify relevant assessment matters, and the applicable standards and objectives. The RMA is interpreted by the Proposed Otago Regional Policy Statement (2021); Regional Plan: Water for Otago (2025) and the Proposed Queenstown Lakes District Plan and is not further reviewed here.

#### 3.1 NZ National Policy Statement For Freshwater Management (2020), amended 2025

The Regional Plan: Water for Otago (2025) states:

*7.C.4 When considering any resource consent to discharge a contaminant to water, to have regard to any relevant standards and guidelines in imposing conditions on the discharge consent.*

##### *Explanation*

*The primary concern for the Otago Regional Council, in considering resource consents, is protecting the natural and human use values supported by water bodies. Guidelines applicable to Otago may assist in this task in terms of the development of resource consent conditions controlling the effects of any particular contaminant in the receiving waters.*

*This Plan does not set generic numerical standards for particular contaminants. Instead the Plan identifies specific natural and human use values and, prior to granting a discharge consent, Council must be satisfied that those values will not be compromised. Guidelines will be used when applicable to the type of discharge and the nature of the receiving environment. These will be considered on a case by case basis.*

The NPS-FM provides the standards against which the effects of the proposed WWTP are assessed in this report. These are fully defined by GHD (2026) and include reference to the NPS-FM:

- Human Contact compulsory value (Appendix 1A),
- Primary contact sites (Clause 3.27)
- National target for primary contact (Policy 12 and Appendix 3), and
- the Natural form and character value (Appendix 1B).

Other NPS-FM provisions relate to matters which can influence recreation indirectly (e.g. ecosystem health and fish passage).

Appendix 1A, Value 2-Human Contact is a compulsory value that every regional council must recognise and provide for. It is defined as:

*... the extent to which an FMU or part of an FMU supports people being able to connect with the water through a range of activities such as swimming, waka, boating, fishing, mahinga kai, and water skiing, in a range of different flows or levels. Matters to take into account include pathogens, water clarity, deposited sediment, plant growth (from macrophytes to periphyton to phytoplankton), cyanobacteria, other toxicants, and litter.*

Value 4- Mahinga kai is a compulsory value and:

*Generally, refers to freshwater species that have traditionally been used as food, tools, or other resources. It also refers to the places those species are found and to the act of catching or harvesting them.*

Clause 3.27-Primary contact, of the NPS-FM relates to public open space, as follows:

1. *Every regional council must monitor primary contact sites for:
  - a. *their risk to human health; and*
  - b. *their suitability for the activities that take place in them (for example, by monitoring whether there is slippery or unpleasant weed growth, and the visual clarity of the water).**
3. *Every regional council must identify, for each primary contact site in its region, a time period (a bathing season) during the year when the regional council considers that the site is regularly used or would be regularly used but for existing freshwater quality, for recreational activities.*
4. *During the bathing season for primary contact sites, every regional council must undertake weekly sampling for E. coli at each relevant monitoring site.*
5. *However, if a single sample taken during the bathing season from a monitoring site is greater than 260 E. coli per 100 mL, the regional council must (unless the council is satisfied that the elevated result is temporary or the cause is being addressed):
  - a. *increase sampling frequency to daily, where practicable; and*
  - b. *take all practicable steps to identify potential causes of microbial contamination.**
6. *If a single sample from a monitoring site is greater than 540 E. coli per 100 mL, the regional council must, as soon as practicable, take all practicable steps to notify the public and keep the public informed that the site is unsuitable for primary contact, until further sampling shows a result of 540 E. coli per 100 mL or less.*
7. *A regional council may comply with subclause (6) by, for example, erecting signs and publicising the situation, or liaising with an environmental health officer or other relevant body or person to co-ordinate how to inform the public about the situation.*

Policy 12 directs that the national target for water quality improvement, as set out in Appendix 3, is achieved. Appendix 3 sets a national target to increase the proportion of specified rivers and lakes that are suitable for primary contact to at least 80% by 2030, and 90% no later than 2040. The Kimi-ākau/Shotover River, as a fourth-order or greater river, is a specified river for the purposes of this target.

Appendix 1B, *Value 1-Natural form and character* is a value that must be considered by every regional council. It describes an FMU with particular natural qualities that people value, including exceptional, natural or iconic aesthetic features, with specific matters including the colour and clarity of the water. These attributes are directly relevant to the amenity value of the Kimi-ākau/Shotover and Kawarau rivers for recreation and tourism.

The proposed discharge outfall area is not a primary swimming spot or primary contact recreation site but is a frequented location for many secondary contact recreation activities (specifically commercial jetboating).

Otherwise, this assessment reviews the degree to which the proposal has an effect on amenity values in relation to recreation and tourism. As summarised in the Landscape

and Natural Character Assessment (Boffa Miskell, 2026), construction will temporarily reduce amenity around the outfall site and these effects will be most noticeable for close-range users (within about 50–100 m), including walkers, cyclists and anglers, while kayakers and jet boaters are likely to experience them only briefly from mid-channel.

The most affected area will be the trail segment along the Shotover training line, where trenching and reinstatement during construction of the pipeline will temporarily alter landscape character, though this occurs within an existing infrastructure corridor. For users further away (around 400 m–1.5 km), construction will be a minor component of an already modified view, with amenity effects assessed as moderate but very short-term for nearby users, reducing to low with distance and negligible once works are completed and reinstated.

In the operational phase, amenity effects are expected to be low and highly localised. The buried pipeline will not be visible and the mostly submerged rock outfall will be designed to blend with the river edge, meaning most walkers, cyclists and river users will notice little change to overall river corridor character. Close-range users, particularly anglers, may perceive a small change in bank form at the outfall itself, but this is limited in extent and within an already highly modified delta margin, so long-term effects on amenity and recreational experience are assessed as low and less than minor (Gavin, 2026).

### 3.2 Water Conservation (Kawarau) Order (1997) (WCO)

The WCO identifies the Kawarau River mainstem and the Kimi-ākau/Shotover River mainstem as waters with outstanding characteristics that warrant protection, including for recreational purposes, in particular rafting, jetboating and kayaking. Clause 4(1) provides that waters in Schedule 2 contain amenity and intrinsic values that warrant protection because they are considered outstanding, clause 4(2) states that those outstanding values “*shall be sustained*”, and clause 4(4) confirms that the characteristics of those waters “*are protected*.”

Clause 4(3) is relevant to this assessment because it identifies the kinds of outstanding characteristics that may be protected, including characteristics:

*(c) for its wild, scenic, and other natural characteristics:...*

*(e) for recreational, or historical purposes*

For the Kawarau River mainstem, Schedule 2 identifies outstanding characteristics including:

*“(c) wild and scenic characteristics;...*

*(e) recreational purposes, in particular rafting, jetboating, and kayaking.”*

For the Kimi-ākau/Shotover River mainstem, Schedule 2 identifies outstanding characteristics including:

*“(c) wild and scenic characteristics;*

*(c) natural characteristics, in particular the high natural sediment load and active delta at confluence with Kawarau River;...*

- (e) recreational purposes, in particular rafting, kayaking, and jetboating;*
- (f) historical purposes, in particular goldmining.”*

The above expressly recognise that both rivers are protected for the very activities that are central to the recreation and tourism use of the receiving environment (i.e., rafting, jetboating and kayaking) and they also protect the associated wild, scenic and natural characteristics that underpin the amenity and experiential value of those activities.

Schedule 2 also requires, for both the Kawarau River mainstem and the Kimi-ākau/Shotover River mainstem, that: “*water quality [be] managed to Class CR standard.*”

That requirement is particularly relevant to recreation because it establishes a water quality management benchmark for contact recreation. In recreation and amenity terms, this means the rivers are not only valued for being used, but are to be managed so that water quality remains suitable for human contact and does not undermine the experience of being on, in, or immediately beside the water. For rafting, kayaking and jetboating, this is directly relevant because those activities involve close physical interaction with the water through spray, splashing, immersion risk and the general perception of water quality.

The WCO is also relevant to amenity because the protected characteristics are not limited to recreation use in a narrow sense. The specific reference to wild and scenic characteristics and, in the case of the Kimi-ākau/Shotover, to the river’s high natural sediment load and active delta at the confluence with the Kawarau River, shows that the Order protects the natural and visual qualities that shape people’s appreciation of the river corridor. These qualities contribute to the attractiveness, memorability and naturalness of the setting, all of which are central components of recreation amenity.

### 3.3 Proposed Otago Regional Policy Statement (PORPS) (2021)

The following provisions of the Proposed Otago Regional Policy Statement (PORPS) 2021 are relevant to recreation, public access, open space and water quality values.

Recreation: water contact and human health

- *LF-FW-O3(4): Water bodies in the Clutha Mata-au FMU support a range of outdoor recreation opportunities.*
- *LF-FW-P8(5): Specified rivers and lakes must be suitable for primary contact recreation by 2030 and 2040.*
- *LF-FW-P17(2)(f): Discharges must not prevent water bodies from meeting applicable water quality standards.*
- *SRMR-I9: Infrastructure capacity failures causing wastewater overflows have significant adverse impacts on human health and recreational amenity.*

Public access

- *LF-LS-P27: Maintain existing public access; restrictions only for listed reasons including health and safety or operational requirements.*
- *LF-LS-M14(4): Facilitate public access via esplanade reserves and legal roads - relevant to Twin Rivers Trail connectivity.*

- *CE-P9: Consistent direction across domains - access restrictions narrowly constrained.*

#### Amenity values

- *LF-FW-O3(5): High quality waters of Upper Lakes rohe to be protected, recognising significance to Kāi Tahu and the wider community.*
- *LF-FW-O10 and LF-FW-P14: Natural character of rivers and their margins to be preserved; visual and physical attributes of the Kawarau River margin are directly relevant.*
- *NFL-O2 and NFL-P3: Values of highly valued natural features and landscapes (including the Kawarau River corridor) to be maintained or enhanced.*

The PORPS identifies several significant resource management issues (SRMR) directly relevant to the recreation context of this assessment.

#### *SRMR-I9 - Otago's Lakes*

These issues recognise that recreation is a core value of Otago's rivers, lakes and coastal environment. SRMR-I9 notes that the Otago Lakes area - which includes the Kawarau River and its tributaries - is subject to significant pressures from tourism and population growth. It specifically identifies:

- The accessibility of water bodies for recreation as one of the core values assigned to Otago's lakes and rivers.
- That infrastructure capacity limits can result in wastewater overflows with significant adverse impacts on human health and recreational amenity.
- That overcrowding impacts can adversely affect urban amenity and recreation experiences of both tourists and residents.
- These issues underpin the policy direction requiring that recreation values and amenity be maintained or enhanced in the Shotover–Kawarau context.

#### **Land and freshwater**

##### *LF-FW-O2 - Visions for each FMU and rohe*

Sets an overarching freshwater vision applicable across all FMUs, including that the health of water supports the health of people and their connections with water bodies (clause 6), and that direct discharges of wastewater to water bodies are phased out to the extent reasonably practicable (clause 8).

##### *LF-FW-O3 - Clutha Mata-au FMU vision*

For the Clutha Mata-au FMU (which includes the Kawarau River and the Upper Lakes rohe), the vision specifically provides that water bodies support a range of outdoor recreation opportunities (clause 4), and that the high quality waters of the lakes and their tributaries are protected, recognising the significance of these waters to Kāi Tahu and to the wider community (clause 5). Outcomes in the Upper Lakes rohe are to be achieved by 2030.

##### *LF-FW-O8 - Fresh water*

Provides that the significant and outstanding values of Otago's outstanding water bodies are identified and protected. The Kawarau River is an outstanding water body under the Water Conservation (Kawarau) Order 1997, giving this objective particular weight.

*LF-FW-O10- Natural character*

Requires that the natural character of wetlands, lakes and rivers and their margins is preserved and protected from inappropriate subdivision, use and development. Natural character is closely connected to the recreation and amenity values of the river environment. These are values that underpin the recreational experience of those rivers and are relevant to any assessment of effects on riparian areas associated with the proposed discharge activity.

*LF-FW-P8 - Fresh water*

Requires that environmental outcomes, attribute states, environmental flows and levels, and limits ensure: that the health and well-being of water bodies and freshwater ecosystems is maintained or improved; and that specified rivers and lakes are suitable for primary contact recreation - by 2030, 90% of rivers and 98% of lakes, and by 2040, 95% of rivers and 100% of lakes (clauses 5(a) and 5(b)). This is directly relevant to the NPS-FM contact recreation standards applied in this assessment.

*LF-FW-P14 - Preserving natural character and instream values*

Requires preservation of the natural character and instream values of lakes, rivers and their margins. Relevant provisions require that the form and function of a water body reflecting its natural behaviours is sustained to the extent practicable; Water Conservation Orders are recognised and implemented; and the values of riparian margins are maintained or enhanced. These provisions are directly applicable to assessing the effects of the outfall structure and the discharge on the natural character of the Kawarau River margins, which are summarised in later sections.

*LF-LS-P27 - Public access*

This is the key public access policy for lakes and rivers. It requires providing for public access by: maintaining existing public access; seeking opportunities to enhance public access (including for mana whenua for mahika kai); and encouraging landowners to avoid restricting access unless necessary to protect health and safety, significant natural areas, areas of outstanding natural character, outstanding natural features and landscapes, historic heritage, places of significance to Kāi Tahu, establishing vegetation, or operational requirements of a lawfully established activity. The assessment has identified the outfall structure itself as the only location where access may be locally affected.

Methods - District Plans

*LF-LS-M14(4) - Facilitating public access*

Territorial authorities must facilitate public access to and along lakes and rivers by requiring esplanade reserves and strips, and promoting the use of legal roads (including paper roads) and other means of public access connecting with esplanade reserves and strips. This underpins the relevance of the Twin Rivers Trail and riparian access to the Kawarau River margins addressed in the assessment.

### 3.4 Conservation Management Strategy (CMS) Otago (2022)

The Otago Conservation Management Strategy 2016 (CMS) was prepared under the Conservation Act 1987 and provides direction for the management of public conservation lands and waters in Otago. The following provisions are relevant to recreation, public access, and open space values for the Kimi-ākau/Shotover and Kawarau Rivers.

Section 2.3-*Western Lakes and Mountains / Ngā Puna Wai Karikari a Rākaihautū* encompasses the Kawarau River and its tributaries, including the Kimi-ākau/Shotover River. The Outcome for this Place identifies the area as a premier outdoor recreation and tourism destination:

*"The mountains, lakes and rivers are cherished natural wonders that draw international and domestic visitors and provide an outstanding backdrop to and locations for a wide range of outdoor adventures and activities."*<sup>3</sup>

Section 2.10- *Freshwater / Wai Māori Place* addresses the management of rivers, lakes and wetlands across all of Otago. The Outcome for this Place specifically recognises recreational values and public access:

*"Otago's freshwater environments (rivers, wetlands, estuaries and lakes and their margins, from the mountains to the sea-ki uta ki tai) are healthy and vibrant and supporting the range of Otago's indigenous habitats and species. They are cherished for their natural, historic, cultural, recreational and economic values. Otago communities are advocates for, and actively engaged in, caring for, understanding, protecting and restoring freshwater riparian and aquatic ecosystems, and the services and recreation opportunities they provide."*<sup>4</sup>

The outcome further states: *"Public access to and along rivers, lakes and wetlands is enabling recreational opportunities, which support and link rural communities and increase public awareness of, and support for, freshwater habitats and values."*<sup>5</sup>

Policy 2.10.1 emphasises the connection between land use activities and freshwater ecosystems, and ensuring land use activities do not adversely affect freshwater ecosystems. The explicit inclusion of recreational freshwater fisheries at clause (b) *"indigenous and recreational freshwater fisheries, freshwater fish habitats and riparian ecosystems"*, provides context to the protection of recreational values of the Kimi-ākau/Shotover and Kawarau rivers.

Finally, Policy 2.10.10 Public access to and along rivers directs the Department of Conservation to work cooperatively to support public access to and along rivers.

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<sup>3</sup> DOC. CMS-Otago (2016)(pg.64)

<sup>4</sup> DOC. CMS-Otago (2016)(pg.120)

<sup>5</sup> DOC. CMS-Otago (2016)(pg.121)

*"Provide information and work cooperatively with the New Zealand Walking Access Commission and Fish and Game Council on matters relating to public access to and along rivers."*

The proposed discharge fits within the context of the recreational values or public access outcomes identified in the CMS. Water quality downstream of the discharge meets the Excellent category for primary contact recreation, effects on fish habitat are highly localised and minor, and access to and along the river margins is maintained during operation. Construction-phase disruption will be managed through appropriate access mitigations, consistent with the cooperative access management approach promoted by Policy 2.10.10.

### 3.5 Regional Plan: Water for Otago (2025)

The Regional Plan: Water for Otago (2025) provides a structured framework for managing the natural and human use values of lakes and rivers, including recreation, amenity and public access. Chapter 5 recognises that the use and development of water resources, and activities in, on, under or over the beds or margins of lakes and rivers, can adversely affect natural character, amenity values and public access, which are central to the recreational experience.

The following objectives and policies relate to recreation, public access and amenity:

- 5.3.1- *"To maintain or enhance the natural and human use values, identified in Schedules 1A, 1B and 1C, that are supported by Otago's lakes and rivers."*
- 5.3.3- *"To protect the natural character of Otago's lakes and rivers and their margins from inappropriate subdivision, use or development."*
- 5.3.4- *"To maintain or enhance the amenity values associated with Otago's lakes and rivers and their margins."*
- 5.3.5- *"To maintain or enhance public access to and along the margins of Otago's lakes and rivers."*

Policy 5.4.2 - *"In the management of any activity involving surface water, groundwater or the bed or margin of any lake or river, to give priority to avoiding, in preference to remedying or mitigating:*

*(1) Adverse effects on: ...*

*(e) The natural character of any lake or river, or its margins;*

*(f) Amenity values supported by any water body; ..."*

For the Kawarau and Kimi-ākau/Shotover rivers, Policy 5.4.2 establishes an effects management hierarchy that requires adverse effects on natural character and amenity values, including recreation related amenity, to be avoided as a first priority. In the context of a treated wastewater discharge, examples of how natural and human use values can be adversely affected include:

*(a) "Taking, damming and diversion of surface water;*

*(c) Discharges to water, and to land in circumstances which may result in a contaminant entering water;*

*(d) Activities in, on, under or over the bed or margins of lakes or rivers."*

As addressed above, for contact recreation, health risk within the near-field mixing area (of 40m) is minor and after reasonable mixing is negligible. GHD (2026) notes that the discharge structure will cause a small reduction in river cross-sectional area (approximately 3.5% at low flow and up to ~7% during higher flows). Resulting effects on river hydraulics and lake level dissipation are expected to be less than minor, and therefore no damming or major diversion of water is occurring. As described in the AEE (2026) any residual uncertainty can be addressed through detailed design, with sufficient flexibility to mitigate potential flooding risks.

Overall, while the project will create adverse effects relevant to recreational activities and amenity they are at most minor and very confined in scale to the immediate area of the outfall structure.

Policy 5.4.5 gives effect to recognising the Water Conservataion (Kawarau) Order 1997.

Policy 5.4.6 - *“Legal public access to and along the margins of lakes and rivers will only be restricted where necessary...*

*(b) To protect the health or safety of people and communities; ...”*

Policy 5.4.7 - *“Where existing public access to or along the margins of Otago’s lakes or rivers is restricted by activities in, on, under or over the bed or margin, the provision or enhancement of alternative access:*

*(a) May be required with respect to the restriction of existing legal public access; and*

*(b) Will be promoted with respect to the restriction of informal access arrangements.”*

For the Shotover WWTP, the design of the rock outfall does not inhibit access to the majority of the study area and does not interfere with terrestrial recreation or in river activities such as jetboating or kayaking.

Policy 5.4.8 – *“To have particular regard to the following features of lakes and rivers, and their margins, when considering adverse effects on their natural character:*

*(a) The topography, including the setting and bed form of the lake or river;*

*(b) The natural flow characteristics of the river;*

*(c) The natural water level of the lake and its fluctuation;*

*(d) The natural water colour and clarity in the lake or river;*

*(e) The ecology of the lake or river and its margins; and*

*(f) The extent of use or development within the catchment...”*

These matters are addressed in the technical reports of Boffa Miskell on ecology and landscape. The natural features of the water like natural colour and clarity impact recreationists’ perception of water quality. The proposed discharge, given its advanced treatment, will not alter the visual appearance, colour or clarity of the water. The works required to install the discharge structure/pipe will result in some minor localised sedimentation managed by an earthworks management plan. Given the high sediment

loading in the Shotover, with appropriate controls, sediment release during construction is assessed as having a very low level of effect.<sup>6</sup>

Policy 5.4.9 – *“To have particular regard to the following qualities or characteristics of lakes and rivers, and their margins, when considering adverse effects on amenity values:*

*(a) Aesthetic values associated with the lake or river; and*

*(b) Recreational opportunities provided by the lake or river, or its margins.”*

Section 5.4.9 specifically gives particular regard both to aesthetic values and to recreational opportunities, and explicitly recognises that amenity values are closely tied to the range of activities a water body supports. In the Kawarau and Kimi-ākau/Shotover context, this encompasses the whitewater rafting, kayaking, jet boating, walking, angling and other active and passive recreation that rely on the rivers’ visual quality, natural character and water quality.

Finally, the following Anticipated Environmental Results (AERs) from Chapter 5 are specifically relevant to recreation, public access and amenity:

- AER 5.5.5: *“People and communities can continue to access the resources of lakes and rivers and their margins.”*
- AER 5.5.8: *“People and communities can continue to enjoy and appreciate the amenity values of Otago’s lakes and rivers.”*
- AER 5.5.9: *“Public access to and along Otago’s lakes and rivers is maintained or enhanced.”*

For the Shotover WWTP, these AERs confirm that the intended outcomes of the Plan include maintaining community access and amenity enjoyment of Otago’s lakes and rivers. For the purposes of this assessment, the proposed Shotover WWTP discharge on the Kawarau and Kimi-ākau/Shotover rivers does not inhibit people from accessing the rivers and their margins outside of the rock outfall itself, and individuals can continue to enjoy and appreciate their amenity values to the same level as anticipated by the Plan. Policy 5.4.5, which gives effect to the Water Conservation (Kawarau) Order 1997, is addressed separately above in the context of the WCO assessment. Policies 5.4.6 and 5.4.7, which relate to the restriction and reinstatement of public access, are relevant during the construction phase and are addressed through the access mitigations identified in this assessment.

### 3.6 Proposed Queenstown Lakes District Plan (PDP)

At the district planning level, the study area falls an Informal Recreation Zone. Chapter 38- Open Space and Recreation Zones states that the zones are to:

*“enable recreation activities and provide for... commercial and informal recreation,” and*

*allow development only where it “will maintain the overall landscape values, visual amenity values and recreation experiences of users of the sub-zone.”*

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<sup>6</sup> Boffa Miskell. (2026). Landscape and Natural Character Assesment. pg. 32

For riverside reserves, including those in the study area, the following policies are relevant:

- Policy 38.2.1.4 – *“Protect open space, recreation and amenity values by managing the adverse effects of, and conflicts between, different types of recreation activities.”*
- Policy 38.2.1.5- *“Avoid activities that do not have a practical or functional need to be located within Open Space and Recreation Zones, unless a particular activity:*
  - a. is compatible with and does not affect the continued operation of established activities;*
  - b. is of a location, nature and scale that does not preclude development of new open space and recreation activities; and*
  - c. maintains or enhances recreation, amenity, and heritage values.”*
- Policy 38.2.2.5- *“Ensure that any buildings or structures located within, adjoining or nearby to an Outstanding Natural Feature or Landscape, protect, maintain or enhance values of the Outstanding Natural Feature or Landscape by:*
  - a. limiting development and activities in the vicinity of water bodies to the land based components of community recreation water based activities, which have a practical and functional need to be located within these areas; (refer also to Objective 38.2.4)*
  - b. preserving the natural character of the margins of waterbodies; (refer also to Objective 38.2.4)”*
- Policy 38.2.4.2- *“Recognise and provide for the maintenance and enhancement of public access to, and enjoyment of, the margins of lakes and rivers, particularly where access and enjoyment is compatible with protecting the natural character and nature conservation values of those lakes and rivers.”*
- Policy 38.2.4.3 – *“Enable people to have access to a wide range of community recreational experiences on the margins of waterbodies, including the limited provision of commercial recreation activities that maintain landscape, amenity and nature conservation values, especially where they integrate with recreation activities on and under the surface of the waterbody.”*
- Policy 38.2.4.4 – *“Ensure that the development and use of Open Space and Recreation Zones, and the interface with the surface of water bodies adjoining these zones, is managed to maintain and enhance amenity values and ensure the health and safety of people and the safe movement of people and goods.”*

The proposed outfall infrastructure has a clear practical and functional need to be located at the river margin, and the findings of this assessment demonstrate that it will not preclude existing or new recreation activities, displace users, or materially affect the amenity or landscape values of the zone. Public access to the river margins is maintained during operation, and construction-phase disruption will be localised, temporary and managed to minimise conflict with established recreation use, consistent with Policy 38.2.1.4 and the broader open space and recreation objectives of the PDP.

## 4 Summary of recreation attributes

This section summarises the recreation attributes of the study area, defined in (Figure 6)

The source data are presented in [Appendix 1](#).

The proposed discharge point for QLDC's long-term treated wastewater disposal solution is located at the eastern end of the Shotover Delta, at the confluence of the Kimi-ākau/Shotover River and the Kawarau River, to the south of the WWTP.

The Kimi-ākau/Shotover River is a fast-flowing river of approximately 75 km in length, originating in the Southern Alps and characterised by numerous rapids and gorge sections of significant scenic and recreation value. The Kawarau River flows eastward from Lake Wakatipu, constituting the lake's only natural outlet, and passes through dramatic scenic gorge terrain before joining the wider Clutha/Mata-Au catchment. Together, these two river systems form one of the most visited and intensively used river recreation environments in New Zealand.

The Kimi-ākau/Shotover River and delta have regionally recognised levels of use for a wide variety of terrestrial and water-based activities including walking, mountain biking and cycling, motocross and ATVing, four-wheel driving, dog walking, and general family recreation, as well as small boat activity including kayaking, whitewater rafting and pack rafting, riverboard surfing, and stand-up paddle boarding (SUP). Tourism is one of the major draws to this area with jet boating being an extremely popular recreation and tourism activity. Fishing is also a very popular tourism and recreation activity on both the Kimi-ākau/Shotover River and the Kawarau River. Both rivers are monitored by the ORC for water quality for bathing.

Boffa Miskell (2026), in their assessment of ecological values in the vicinity of the outfall, noted a variety of fish species (Table 13) in the Shotover and Kawarau at multiple sites when undertaking the sampling in March 2026.

A preliminary water quality assessment was undertaken by Landpro in 2024 which noted that,

*“number of species, such as Longfin eel and brown trout have been recorded by NZFFD in the Kawarau River, and it is likely rainbow trout and quinnat salmon are also present. The trout fishery of the river is nationally significant, and the channel is a significant habitat for kōaro; Galaxias brevipinnis, a climbing galaxiid species part of the whitebait run, they can also form land locked populations where they are able to complete their entire lifecycle in a lake” (Landpro, 2024, p. 4)*

The report also noted that for water quality, indicator clarity, the Kawarau fell within a C Band- Moderate to high impact of suspended sediment on instream biota. This noted that there was the potential for sensitive fish species to be lost. For the Shotover, a D Band was recorded- High impact of suspended sediment on instream biota. This indicated that ecological communities are significantly altered and sensitive fish and

macroinvertebrate species are lost or at high risk of being lost. The national bottom line is between C and D.<sup>7</sup>

Stakeholder interviews with local anglers also noted that there were trout spawning beds upstream and across the river from the discharge point although the ecological testing by Boffa Miskell did not note any spawning areas within the study area.

The entire study area is easily reached via the Shotover Delta Road (gravel road) to an informal 4WD track from State Highway 6 via, with multiple access and entry/exit points supporting the wide range of recreation activities that occur there. Shotover Delta Road provides the most direct vehicular access to the Shotover Delta at the confluence of the Kimi-ākau/Shotover and Kawarau rivers, historically serving as the entry point to an informal recreation zone managed by QLDC. Located on the true right bank of the Kimi-ākau/Shotover River, the informal recreation area adjacent to Shotover Delta Road sits in close proximity to the proposed rock outfall structure and functions as the primary arrival point for people accessing the lower Shotover environment on foot, by bike via the Twin Rivers/Queenstown Trail, or by launching small watercraft such as kayaks. This informal recreation area makes it one of the closest and most common public access location relative to the proposed discharge site.

Figure 6-8 are photos of the Shotover Delta and the area for the proposed discharge/rock outfall. Tire marks



Figure 7: Shotover delta and proposed discharge site (looking towards the Shotover confluence)



Figure 9: Remnants of Freedom Camping and 4WD tracks near the rivers edge (note: Freedom Camping is prohibited in this area)



Figure 8: Shotover delta and proposed discharge site (looking downstream)

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<sup>7</sup> Landpro, 2024. *Water Quality Baseline Snapshot for Queenstown Wastewater Treatment Plan and Surrounds.*

from motoX/dirt biking be seen in the stones and residual fire wood from bonfires (camping remnants – despite being prohibited), bike tracks and multiple different types of footprints (e.g., canine, animal, and human) can be seen in the photos.

Commercial operators, including Shotover Jet, Thunder Jet, Queenstown Rafting/RealNZ, and KJet, each maintain their own operational bases and utilise a combination of shuttle services and water-based access to bring customers to and from their respective activity zones on the Kimi-ākau/Shotover and Kawarau rivers. These commercial access patterns are layered over the broader public access network described above and further intensify the recreational use of the receiving environment.

#### 4.1 Wider environment

Beyond the immediate receiving environment at the proposed outfall and confluence margin, the wider recreation environment includes the Kawarau River downstream from the Shotover confluence, the adjacent Twin Rivers Trail corridor, and the broader Kawarau corridor extending through the Gibbston Valley. This area is defined as the area outside the immediate study area, mainly downstream from the proposed discharge and upstream of the discharge close to Lake Wakatipu.

The Kawarau reach downstream of the confluence supports a mix of informal and commercial recreation, with nationally significant whitewater recreation areas (e.g., the four significant rapids on the commercial rafting stretch - Smiths Falls, Twin Bridges, Do Little Do Nothing, and the 400m Dog Leg) , located approximately 9km downstream of the outfall. The Twin Rivers Trail corridor runs along the downstream section of the Kawarau and provides public access to the Kawarau and lower Shotover margins, including viewpoints, rest points and local access nodes such as Billies Bridge. This corridor is used for walking, cycling, sightseeing, stopping at river beaches, and accessing the river margin, and it forms part of the setting through which many local residents and visitors experience the Kawarau–Shotover confluence and downstream river environment.

The wider river corridor downstream of the confluence is also used by commercial recreation operators. This includes KJet operations on the Kawarau and Kimi-ākau/Shotover Rivers, commercial float trips and rafting activities, river boarding, and kayaking in reaches downstream of the confluence, as well as the broader Kawarau River through the Gibbston Valley, which is used for commercial rafting and associated visitor experiences. For the purposes of the effects assessment, these downstream and corridor-based areas are distinguished from the immediate setting around the outfall itself (near-field mixing area) and the reasonable mixing zone, and the WWTP will have a negligible effect on recreation.

## 5 Recreation Attributes and Existing Recreation Values- Literature Review

The section summarises a comprehensive literature review of recreation use relevant to the Shotover Delta and Kawarau–Shotover system contained in [Appendix 1](#), and review of perceptions of water quality relevant to recreation participation is contained in [Appendix 2](#).

Recreation within the Shotover Delta and the Kawarau–Shotover confluence is characterised by varied patterns of use, combining high-volume trail-based activities with regionally significant water-based recreation. Visitor survey data for the QLDC indicate that the natural environment, scenery, and outdoor activities are the primary drivers of visitation, with walking, hiking, and water-based pursuits among the most frequently reported activities. Table 3 summarises each type of recreation and its recreation value within a regional context.

The Kawarau and Kimi-ākau/Shotover Rivers support whitewater rafting, kayaking, jet boating, angling, and swimming opportunities, and form part of a wider Clutha catchment recognised as a core destination for river-style boating and freshwater fishing. National and regional assessments, including angler and jet boating surveys, confirm that these rivers contribute materially to Otago’s recreation portfolio, both in terms of participation levels and the quality of experience sought by users. Environmental DNA and angler survey data confirm diverse fish communities and sustained interest in trout and salmon fisheries, reinforcing the importance of maintaining high water quality, natural character, and reliable access to the river margins.

Perceptions of water quality are a key determinant of how residents and visitors use and value the Kimi-ākau/Shotover and Kawarau Rivers. Regional research indicates that Queenstown Lakes residents generally hold positive views of local water quality, with clarity, colour, absence of rubbish, and perceived suitability for swimming and fishing all strongly influencing their assessments and recreation choices. Consultation undertaken for Otago Regional Council’s water quantity planning processes nonetheless highlighted concerns regarding the effects of tourism growth, urban development, motorised boating, and aquatic weed proliferation on perceived natural character and amenity, particularly in high-use reaches of the Kawarau River near Queenstown.

Other literature demonstrates that recreation behaviour is highly responsive to perceived, rather than measured, water quality, and that even fully compliant discharges can discourage use where they are associated with visible changes in clarity, colour, or the presence of treated wastewater. Experimental work shows that relatively small reductions in visual clarity can shift public perceptions of suitability for bathing from “acceptable” to “marginal”, and social research indicates that frequent users such as anglers and paddlers are particularly sensitive to signs of degradation. For the purpose of this proposal, these perceptual dynamics operate within a setting already subject to a Water Conservation Order requiring contact-recreation standards be met, meaning that any discharge which visibly alters clarity, colour, or perceived cleanliness has potential to disproportionately affect recreation behaviour and community confidence.

**Table 3: Regional significance of recreation activities within the Shotover–Kawarau study area**

<b>Recreation Activity</b>	<b>Recreation Value</b>	<b>Reasoning (for rating against regional context-based within the study area)</b>
<b>Jet Boating (commercial)</b>	High	Commercial jet boating is a regionally prominent activity on the Shotover–Kawarau system, with established operations and strong links to Queenstown’s adventure tourism brand. Within the study area it contributes significantly to visitor experience and river-based recreation, but is one of several high-value jet boating reaches within the system and across Otago, supporting a “high” rather than exceptional level of regional significance.
<b>Jet Boating (non-commercial)</b>	Moderate	Non-commercial jet boating occurs regularly on the Shotover–Kawarau system, benefiting from easy access, relatively forgiving conditions and proximity to Queenstown. However, participation is more dispersed and opportunistic than for commercial trips, and comparable opportunities exist on other Otago rivers, so its regional significance is best described as moderate.
<b>Swimming (downstream, adjacent to lake Hayes)</b>	Low	Swimming use in the study area is localised to a small number of access points near the beach by Shotover Country (Figure 6), and outside the study area downstream of Lake Hayes Estate and is relatively limited compared with the district’s major lake beaches and river swimming spots. While important for nearby residents, these local swimming spots represents a minor component of regional swimming provision, supporting a low level of regional significance as there are other areas within the region that hold more significance for swimming (e.g., Lake Wakatipu)
<b>Angling (commercial)</b>	Low	Guided angling occurs on the Shotover–Kawarau system, typically as part of broader upper Clutha/Kawarau itineraries, but effort is modest compared with premier guided fisheries in the district. The study area is therefore a useful but secondary option within commercial guiding portfolios, providing low regional-level significance in its own right.

<b>Angling (non-commercial)</b>	Low	Non-commercial angling is present but at relatively low intensity compared with the most popular Otago rivers and lakes, and within a catchment that offers numerous alternative access points and fisheries. As such, the study area is locally valued but of low standalone significance at the wider regional scale.
<b>Whitewater sports (e.g., kayaking, pack rafting)</b>	Moderate	The study area functions primarily as an access, exit and transition zone for nationally-recognised whitewater runs upstream and downstream rather than a core whitewater reach in its own right. It is important to paddlers for logistics and short sections of moving water, but regional significance is moderate compared with the flagship whitewater sections elsewhere in the catchment.
<b>Wakatipu Trails Trust (Great Ride/Twin Rivers Trail)</b>	Very High	The Twin Rivers Trail/Queenstown Trail corridor is a primary spine linking communities to the river and a nationally recognised Great Ride. This section of trail is one of the most heavily used sections of the Queenstown Trail network, carrying large annual numbers of walkers and cyclists (both residents and tourists). Within the study area it provides the primary off-road access route to the Kawarau–Shotover confluence (with an adjacent informal dirt track for vehicular access) and the trail as a whole, is a key component of the region’s active recreation and tourism offering, supporting a very high level of regional significance.
<b>River boarding</b>	Moderate	River boarding occurs as a specialist, niche activity associated with the wider adventure tourism product of Queenstown, with trips occasionally using or passing through the study area. While overall participation numbers are modest, the activity contributes to the region’s adventure identity and offers experiences not widely available elsewhere, justifying a moderate regional significance.
<b>Four-wheel driving, MotoX and mountain biking</b>	Low	Vehicle-based and informal off-road riding occurs on river terraces and access tracks but is diffuse and low-intensity compared with dedicated off-road and bike park areas elsewhere in the district. These activities are therefore of low regional significance within the study area, contributing to local recreation opportunities rather than forming a key regional destination.

<b>Other terrestrial recreation (e.g., dog walking near the river's edge)</b>	Low	Informal activities such as dog walking, casual strolling and picnicking along the river margin are important for nearby communities but are characteristic of many river corridors across the district. At a regional scale, the study area makes a modest contribution to everyday local recreation rather than representing a distinctive or scarce destination, supporting a low level of regional significance.
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## 6 Interview Summary

Thirteen telephone interviews were carried out with recreation and tourism users and managers associated with the Kimi-ākau/Shotover–Kawarau River system and the wider study area between mid-April and mid-May 2026. The intent was to identify the scale and type of recreational use and value across all parts of the study area, and to establish whether any differences could influence decisions about wastewater treatment options. As with the literature review, it is clear that almost all parts of the study area are used for recreation; while some areas may be used less intensely, at a local level, none can be described as low value.

Interviewees represented trail governance, commercial tourism (jet boating, rafting, river boarding, packrafting, and fishing charters), organised angling and whitewater clubs, and local advocacy interests ([Appendix 3](#)). The interviews explored current patterns of use, values placed on the river environment, awareness and perception of water quality, and likely responses to the proposed long-term discharge of treated wastewater at the Shotover Delta. The following sections synthesise these interviews into key themes, noting how many interviewees explicitly raised each theme and drawing on direct quotations where these help convey lived experience and potential impacts on recreation. All key issues raised and points of agreement and disagreement are noted below; for full summaries [see Appendix 4](#).

### *Activities*

All interviewees described the Shotover–Kawarau corridor as a heavily-used and diverse recreation landscape supporting a wide spectrum of activities: 4WDing, boat launching, ecological restoration programmes, fishing (boat, spin, and fly), jet boating, kayaking, whitewater canoeing, mountain biking, motocross, motor boating, stand-up paddleboarding (SUP), swimming, walking, and dog walking.

There are no parts of the study area that go unused. While some areas are more popular for specific activities, such as motocross and 4WD on the Shotover Delta, and jet boating on the Kawarau, water-contact recreation occurs throughout via multiple activity types. Fishing was reported at the confluence of the Kimi-ākau/Shotover and Kawarau Rivers, and all down the Kawarau from Lake Wakatipu to the Arrow River confluence.

### *Effects That May Prevent or Reduce Recreation*

Twelve of the thirteen interviewees identified conditions that would deter them or their clients from using the river corridor, or would reduce the quality of their experience:

- Visible water quality changes as a critical threshold. Any discolouration, odour, or visible water quality issue was viewed as unacceptable for primary contact recreation or for launching boats at the Delta. Interviewees noted that if users can see or smell the discharge, many would avoid the area regardless of scientific assurances.
- Signage and risk communication effects. The form and wording of any signage at or downstream of the discharge point were considered highly influential. Prominent "treated wastewater discharge" or "do not swim" signs could stigmatise the area and discourage use even when water quality is safe.

- Construction impacts and access loss. Interviewees emphasised the need to maintain access during works and avoid permanent exclusion zones at small, high-use recreation sites. Fish & Game highlighted that the outfall could remove a small beach used for angling and alter fish behaviour, affecting angler use patterns, and raised concerns that anglers may attempt to fish from any new structure if it provides flow refuge for fish, creating safety and management issues.
- Public perception and reputational risk. Several interviewees linked perceived declines in river health to Queenstown's wider reputation as a high-quality natural destination, with potential direct effects on their businesses. They noted that reputational impacts would extend beyond the discharge reach, influencing recreation choices across the district, including decisions about where to travel, film, or invest in tourism ventures.

### *Water Quality: Condition, Perception, and Participation*

Water quality emerged as a central theme across all interviews, with interviewees consistently distinguishing between actual health risk and perceived quality.

Almost all interviewees were aware of existing water quality issues in the area due to spikes in *E.coli*. All interviewees were also aware of the emergency discharge into the Shotover. One interviewee noted intense backlash through the media due to perceptions of poor water quality on the Kawarau, where they operate a commercial tourism business. Eight interviewees specifically referred to the existing discharge to the Kimi-ākau/Shotover River and the current condition of the Delta environment. Jet Boat New Zealand members reported observations of colour and smell at the outfall during December 2025 to March 2026 (albeit it is quite difficult for jet boaters to get to the outfall on the Shotover River), and several noted historic *E. coli* issues downstream of the Shotover. Clubs such as Central Otago Whitewater described a longstanding informal norm of remembering not to drink the river water while kayaking/boating, reflecting a precautionary attitude shaped by historic water quality issues. Many interviewees stated that they would accept a scientifically robust discharge and continue to operate or recreate, but remained concerned about how it would be understood and experienced by the public.

The physical legacy of the failed land-based disposal system (fenced ponds, barbed wire, and an industrial aesthetic) also contributes to a sense of contamination. The Queenstown Trails Trust described how moving through this area can make people "feel dirty," even knowing they are not in contact with anything harmful, undermining both the desired "world class cycling experience" and the concept of a blue-green corridor.

### *Perception as a driver of behaviour*

Thirteen interviewees emphasised that perception of water quality is often more influential than technical risk assessments. Fish & Game stated that "perception is the reality" for many anglers, particularly those fishing for the table who need confidence in the safety of their catch. Tourism operators described Queenstown's rivers as central to the district's brand, with visitors expecting clean, pristine water and the characteristic turquoise blue colour. One interviewee noted that water quality feedback had "gained traction" in the preceding six months, while another emphasised that "it only takes a couple of bad media releases" to affect bookings.

For whitewater and packrafting operators, perception was linked to broader reputational risk. Typical responses included:

*"People won't remember the details, but they will remember there's 'poop in Queenstown rivers'."*

*"If there were signs of discolouration, odour issues, or visual water quality issues, members would not want to boat there."*

*"Already a perception is that you don't drink the water."*

*"People have seen the outflow, the colour and smell, and have been concerned."*

One interviewee noted that some film projects have reportedly been relocated due to water quality reputation concerns. Primary contact operators highlighted that participation is shaped by both actual safety and how the environment appears; clear water and the absence of visible contamination are critical to client confidence.

#### *Primary Contact Risk and Health*

Eleven interviewees spoke directly about health risks associated with primary contact recreation. Activities such as kayaking, rafting, river boarding, swimming, wading, and fishing involve regular immersion or splashing; jet boaters noted that primary contact is often inevitable. Anglers raised practical questions about effects on fish and potential health exposure through wet hands, small cuts, or accidental water ingestion, noting that any meaningful risk to people or the fishery would make continued operation in the area untenable.

Operators generally accepted that, if the upgraded system performs as modelled, health risks at key recreation sites could be low. However, even low-probability risks were seen as needing transparent communication and careful management, given the nature of activities and the presence of children and international visitors.

#### *Importance of Access and Continuity*

Eleven of the thirteen interviewees explicitly emphasised access as fundamental to their activity. For trail users and cyclists, the Twin Rivers / Queenstown Trail corridor is a primary spine linking communities to the river and a nationally recognised Great Ride. The Queenstown Trails Trust highlighted that the trail serves both recreational and commuting purposes, describing it as "the only safe off-road way to get to the high school from the eastern side." For water-based users, Shotover Delta Road and the Delta launch area are central nodes. Jet boaters, kayakers, and casual recreational users launch from the Delta and travel through the proposed discharge area; the site is also used periodically as an event base for the JBNZ Otago Branch.

Anglers and informal users also rely on a network of formal and informal river margin access points. Fish & Game noted the importance of Shotover Delta Road and the Twin Rivers Trail for providing access for casual evening angling, youth events, and ready access to the river confluence. Whitewater users referenced flexible put-in and take-out locations, while stressing that these depend on safe, legal access and the absence of new hazards or exclusion zones.

Any long-term loss or downgrading of access to key nodes (e.g., Shotover Delta Road, the main trail corridor, and established launch points) would represent a material adverse effect. Construction-phase disruptions are of particular concern for daily users of the Twin Rivers Trail, including commuters and students, and for commercial operators whose logistics rely on predictable road and river access.

Overall, uninterrupted access along this corridor, during construction and over the long term, was described as essential. Retaining continued access is proposed as a consent condition in the AEE.

#### *Mitigations, Management Preferences, and Residual Concerns*

All interviewees proposed mitigation or management measures that could help sustain recreation values if the discharge proceeds, falling into four broad areas:

- **Treatment performance and outfall design.** Near-unanimous support (12/13) was expressed for achieving treatment performance substantially better than minimum guideline thresholds as a way of building confidence over time. Interviewees consistently favoured an unobtrusive outfall design, ideally fully underground, with minimal visible infrastructure. Interviewees also called for a long-term programme to restore the Shotover Delta to a more natural landscape, including decommissioning and rehabilitating the failed land-based disposal ponds, removing chain-link and barbed-wire fencing, and improving the visual quality of the trail corridor.
- **Access and construction management.** Access must be maintained for both public and commercial users throughout construction and operation, and all existing recreation assets must remain in place or be restored. For angling and small-scale recreation, specific attention is needed to minimise permanent exclusion zones and provide alternative access where small beaches or bank areas are directly affected. Signage around any outfall structure should be safety-focused and designed to discourage unsafe behaviour without unnecessarily deterring use of adjacent river margins.
- **Communication, monitoring, and governance.** Strong expectations were expressed around transparency and ongoing communication. Twelve interviewees sought regular, accessible reporting of water quality monitoring results, including timely notification of any non-compliance or system failure. Tourism operators noted the need for advance warning of issues to manage client expectations; relying on delayed test results was seen as an ongoing operational challenge. Interviewees advocated for a clear, co-designed incident response plan setting out thresholds for cancelling or relocating activities, public advisory procedures, and how operators and clubs will be kept informed in the event of a failure.
- **Preference for alternatives to discharge to water.** While many interviewees stated they would continue to use the river if the upgraded system performs as modelled and recreation remains safe, all expressed a clear preference for avoiding discharge to water altogether where practicable.

## 7 Assessment of Effects

This section describes the wastewater discharge activity, its modelled effects on primary and secondary contact recreation and terrestrial activities, and the potential mitigation measures available to reduce those effects. Most recreation activities identified in the study area include some form of accidental water contact - from falling out of, or off various small vessels (jetboats, kayaks, SUP, etc) or getting splashed, or direct water contact via swimming and angling.

The proposed outfall sits within a recreation destination. It occupies an informal launch area for different vessels, is a tourism destination for recreation (e.g., jet boating), and is adjacent to a New Zealand Great Ride. Therefore, effects are limited to fish and angling, human health effects, effects on access, and perception of water quality.

The WWTP proposal which is the basis for this assessment is described in Section 2.

### 7.1 Effects Assessment – Human Health Risks

This assessment evaluates the effects of the treated discharge, including the proposed system upgrades, relative to the ‘existing environment’. For the purposes of this consent application, the existing environment:

- Incorporates the historical effects of the activity, including any changes resulting from the ongoing operation of the WWTP to date (for example the ongoing adverse effects to groundwater from the DAD);
- Includes any infrastructure or structures that it would be unreasonable to assume would be removed if consent was not granted (such as the WWTP itself); and
- Excludes the future effects of the activity that is the subject of this consent application.

#### 7.1.1 Human Health Effects

GHD’s (2026) *Water Quality Assessment* conclusion on the public health risk from the upgraded discharge are:

- Very low *E. coli* concentrations are predicted after reasonable mixing, with these well-within criteria for recreational water use.
- Quantitative health risk assessment indicates low and acceptable risk to swimmers for pathogens as indicated by assessment of infection and illness risk from *Campylobacter* and norovirus.
- Proposed improvements to filtration and additional UV disinfection, if needed, are expected to provide a high level of confidence that pathogen risks can be effectively managed.
- Overall, public health risk from recreational exposure is considered to be low and consistent with maintaining water suitable for bathing as required by the WCO.

Treated wastewater from the WWTP consistently shows low *E. coli* levels following the October 2025 treatment upgrade. Notably, the upstream Shotover River (RS04B), above the emergency discharge, regularly recorded higher *E. coli* concentrations than the treated wastewater between January and May 2026, pointing to diffuse catchment sources (runoff, stock, wildlife, birds) as a stronger driver of downstream water quality than the WWTP discharge itself. Downstream at RS10, concentrations were lower than

upstream due to dilution from the Kawarau River and Lake Wakatipu inflows. Figure 10 shows all the testing sites used by GHD for water quality testing.



Figure 10: Monitoring Sites (GHD)

Table 4 shows that *E. coli* concentrations in treated wastewater are broadly comparable to those measured upstream in the Kimi-ākau/Shotover River, with the 95th percentile at RS04B notably higher than in the treated wastewater, and at RS10 and RS14, indicating that upstream inputs are likely stronger water quality drivers than the WWTP discharge. At monitoring location RS10, downstream of the River confluence, concentrations of *E. coli* reflect the contribution from both the Shotover River (RS04B) and the upstream Kawarau River (RS14). The relative contribution of flow at this location from the Kimi-ākau/Shotover River expected to be low during low-flow periods and increase during high flow periods.

Figure 11 shows the water *E. coli* results from the 4 test locations that have the highest recreation use within the study area. Review of monitoring results indicates that *E. coli* concentrations at RS10 are typically a subdued expression of those at RS04B (i.e., a diluted expression of the fluctuations in *E. coli* concentration at RS04B). This suggests that the most significant influence on *E. coli* concentrations at monitoring

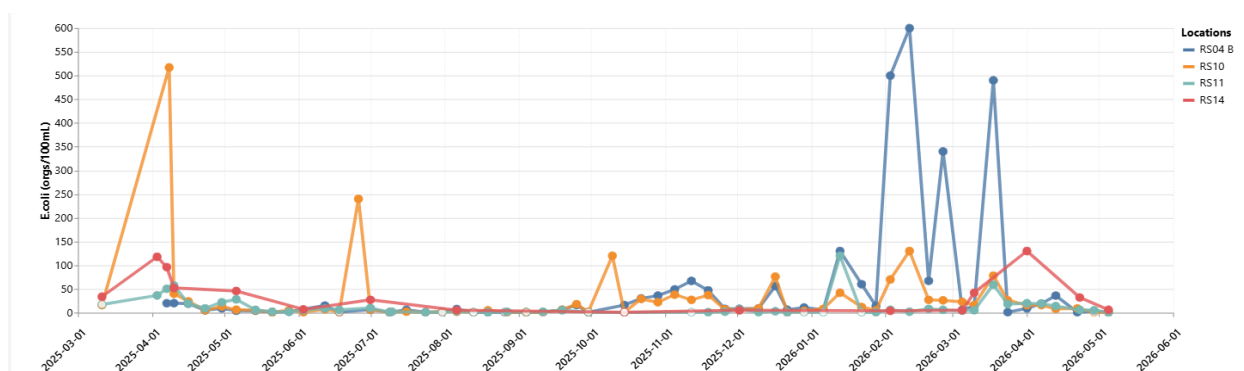


Figure 11: Water *E. coli* Results (GHD)

location RS10 is the Kimi-ākau/Shotover River catchment upstream of RS04B and upstream of the current treated wastewater discharge to the Kimi-ākau/Shotover River.

**Table 4: *E. coli* result summary (source: GHD water quality assessment)**

Location	Date Range	95 <sup>th</sup> percentile
		<i>E. coli</i> (cfu/100ml)
<b>EFF</b> Treated wastewater	3/04/2025 - 29/04/2026	275
<b>RS04B</b> Upstream Shotover	7/04/2025 - 29/04/2026	445
<b>RS10</b> Downstream Kawarau	11/03/2025 - 29/04/2026	124
<b>RS14</b> Upstream Kawarau	11/03/2025 - 23/04/2026	122.1

**Notes:**

- RS14 statistics are based on fewer monitoring results (n=14) compared to the other sites (average of n=52)
- Statistics exclude results below lab detection limits

#### *Mixing zone dilution and effect on recreation*

The mixing zone modelling (GHD, 2026) shows that immediate risk to contact recreation in the near-field is low risk. The predicted *E. coli* concentrations in the mixing zone and after reasonable mixing are expressed in Table 5 (GHD, 2026).

**Table 5: *E. coli* concentrations in the mixing zone and after reasonable mixing**

<b>E.coli Concentration statistic</b>	Within mixing zone – predicted <i>E. coli</i> concentration (#/100ml)	After reasonable mixing <i>E. coli</i> concentration (#/100ml)	NPS-FM (2025) <i>E. coli</i> primary contact sites – National bottom line (#/100 ml)	RPW – Schedule 15 – 80th percentile <i>E. coli</i> (#/100 ml)
<b>95<sup>th</sup>ile</b>	42	29	540	260
<b>Max/Truncated</b>	62	31		

GHD (2026) modelling predicts rapid dilution of treated wastewater in the Kawarau River, from approximately three-fold at the discharge point to five-fold (20% wastewater, 80% river) within 40 metres. Further mixing at the Shotover confluence reduces the discharge contribution to just 2% of total flow by the end of the reasonable mixing zone at RS10, even under conservative low-flow conditions. Comparative CORMIX modelling shows even greater near-field dilution (6–8 fold within 4 metres), confirming that OpenFOAM results are conservative and that elevated pathogen concentrations are unlikely to persist in areas used for primary contact recreation.

The degree to which the WWTP discharge would represent an unacceptable cumulative effect alongside other sources of contamination will depend on the scale and trajectory of those individual sources over time. However, because the WWTP aims to discharge water of a superior quality to that currently present in the river, particularly in the Shotover (which is rated “Fair on the NPS-FM), it is not expected to further degrade the setting, at least until the other existing contamination sources have been effectively controlled.

Tertiary filtration is proposed to be introduced before UV treatment, further removing solids from the treated wastewater before UV irradiation. This has the following benefits for pathogen removal:

- Improved filtration provides for greater removal of organic particles and the microbial communities that are bound to them.
- Improved filtration will result in lower sediment content and greater light transmittance of treated wastewater. Improved transmittance allows for a greater dose of UV energy to be delivered by the UV lamps, with this in turn, increasing the amount of pathogen deactivation prior to discharge of treated wastewater.

Tertiary filtration ahead of UV disinfection will improve pathogen removal by reducing organic particles and increasing UV light transmittance. Additional UV reactors will be required to accommodate the 2060 population. With these upgrades, residual infectious pathogens are expected to reduce significantly below these limits. The water quality assessment robustly characterises pathogen removal and demonstrates that infectious virus levels in the receiving water are very low, supporting the conclusion that public health risk from recreational exposure is low and consistent with maintaining water suitable for bathing under the WCO.

Against the NPS-FM human health criteria for primary contact recreation<sup>8</sup>, RS10 and RS14 both sit in the "Excellent" attribute band, while the treated wastewater and RS04B sit with the “Excellent to Fair” attribute band. The predictions in the AEE are that the water at RS10 will be “Excellent” without any contribution from the Shotover River. With a contribution from the Shotover river, the prediction for water quality as at its worst “Fair”. Notwithstanding, the predicted water quality (with and without the Shotover contribution) meet the A (Blue) Band Icon within the NPS-FM framework for human health risk, meaning that for at least half the time, the estimated risk is <1 in 1,000 (0.1% risk)<sup>9</sup>(Table 6). Also, predicted *E. coli* concentrations within the mixing zone and after reasonable mixing are well below both the NPS-FM national bottom line (540/100ml), and the regional plan 80th percentile limit (260/100ml). The predicted average infection risk is 1% (low to very low risk), therefore, recreational contact values are maintained at and downstream of the discharge point.

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<sup>8</sup> NPS-FM, Appendix 2A, Table 22. “Fair” = Estimated risk of Campylobacter infection has a 1 – 5% occurrence, 95% of the time. Concentrations > 260 - < 500 cfu/100ml. “Excellent” = Estimated risk of Campylobacter infection has a < 0.1% occurrence, 95% of the time. Concentrations < 130

<sup>9</sup> NPS FM, Appendix 2A, Table 9. A (Blue) attribute Band = For at least half the time, the estimated risk is <1 in 1,000 (0.1% risk). The predicted average infection risk is 1%. 95<sup>th</sup> percentil of *E. Coli*/100ml is ≤ 540 (which both “Excellent” and “Fair” fall into)

**Table 6: Human health risks from viruses<sup>10</sup>**

<b>Attribute Band (for Human Contact in Lakes and Rivers) Appendix 2A Table 9- NPS-FM for the WWTP</b>	<b>Attribute Band (for Primary Contact Sites in Lakes and Rivers) Appendix 2A Table 22- NPS-FM for the WWTP</b>	<b>Risk Category</b>	<b>Definition</b>	<b>Meaning for Contact Recreation</b>	<b>Predicted average infection risk</b>	<b>Meaning for Contact Recreation</b>
A (Blue)-95 <sup>th</sup> percentile of <i>E. coli</i> /100ml ≤540 and predicted average infection risk is 1%	Excellent (<0.1% estimated risk of infection)	Very Low Risk	Infection risk is negligible; well within international guidelines.	Safe for all recreation, including primary contact (swimming, jumping, immersion).	<1% gastrointestinal infection	Safe for all recreation, including primary contact (swimming, jumping, immersion).
A (Blue)-95 <sup>th</sup> percentile of <i>E. coli</i> /100ml ≤540 and predicted average infection risk is 1%	Good (0.1-1.0% estimated risk of infection) Fair (1-5% estimated risk of infection)	Low Risk	Acceptable risk level for public health; aligns with WHO tolerable risk for recreational waters.	Suitable for primary contact recreation; infection risk is low and comparable to high-quality recreational sites.	1-5% gastrointestinal infection	Suitable for primary contact recreation; infection risk is low and comparable to other recreational sites.
D (Orange) 95 <sup>th</sup> percentile of <i>E. coli</i> /100ml >1200 and predicted average infection risk is 3%	Poor (>5% occurrence estimated risk of infection, at least 5% of the time)	Moderate Risk	Risk is elevated but still within ranges sometimes accepted for secondary contact.	Generally acceptable for secondary contact (wading, boating). Not preferred for swimming.	>5% gastrointestinal infection	Generally acceptable for secondary contact (wading, boating). Not preferred for swimming.
E (Red) 95 <sup>th</sup> percentile of <i>E. coli</i> /100ml >1200 and predicted average infection risk is 7%	Poor (>5% occurrence estimated risk of infection, at least 5% of the time)	High Risk	Clear public health concern; exceeds acceptable thresholds.	Not suitable for primary contact recreation; elevated infection risk.	>7% gastrointestinal infection	Not suitable for primary contact recreation; elevated illness risk.

<sup>10</sup> Within the near-field mixing area and reasonable mixing zone the water quality conclusions will be within either within the A attribute band or Excellent/Good category in reference to the NPS-FM Table 9 and Table 22.

Virus testing notes that norovirus is measured by PCR (which counts inactive particles and overstates risk), so proxy viruses were used to more accurately estimate UV removal effectiveness, a deliberately cautious approach. The predicted *E.coli* concentrations in the mixing zone and after reasonable mixing are expressed in Table 7 below (GHD, 2026).

<b>Table 7: Treated wastewater virus concentrations</b>		
<b>Test</b>	Concentration by culture <sup>2</sup> (Infectious Units (IU)/L)	Concentration by PCR <sup>2</sup> (Genome copies/ L)
<b>Adenovirus</b>	30	31,000
<b>Enterovirus</b>	<1	<100
<b>Norovirus GI</b>	- <sup>1</sup>	1,700
<b>Norovirus GI</b>	- <sup>1</sup>	8,900

Overall, adopting a norovirus individual infection risk threshold of 5%, as applied in NPS-FM national bottom line for *Campylobacter* infection from recreational use of bathing sites (Appendix 2A, Table 22, NPS-FM (2025)), correlates to a CrAssphage concentration of 30,000 gene copies/100 ml, with this equating to a maximum *E.coli* concentration of approximately 100 MPN/100ml. The predicted concentrations for *E.coli* in the mixing zone are below this threshold, suggest an upper bound individual infection risk in the order of 2%, with risk significantly lower more than 95% of the time.

The assessment notes that QLDC has proposed additional, expanded microbial monitoring of both treated wastewater and river water to build a dataset specific to the Kawarau and Kimi-ākau/Shotover Rivers. Once this monitoring is complete, a location-specific and discharge-specific Quantitative Microbial Risk Assessment (QMRA) will be carried out to refine estimates of public health risk for recreational users. This refined QMRA will incorporate any design refinements to the outfall that improve dilution, updated information on residual active pathogens, river-appropriate exposure assumptions (e.g., shorter swim times than coastal settings), and a range of dose-response models.

The results of the refined assessment will be used to inform detailed design of the discharge structure and determine the specification of any further UV disinfection (proposed onto the already agreed upgrades) up to an additional 2-log virus removal, to address residual uncertainty in predictions of infection and illness risk.

*The outfall as a secondary contact zone*

A distinction central to this assessment is the difference between the immediate outfall area and primary contact recreation sites downstream (which are located just beyond the reasonable mixing zone).

The proposed rock outfall structure and the river margin immediately adjacent to it are not, and have not historically been, used as a primary contact recreation site. As noted in Section 4, the outfall area does not constitute a formal primary contact site within the meaning of Clause 3.27 of the NPS-FM (2020, amended 2025), which requires regional councils to monitor primary contact sites (defined as locations regularly used, or that

would be regularly used but for existing freshwater quality, for recreational activities involving full-body immersion or where swallowing water is likely).

The activities that do occur at and immediately around the outfall (e.g., jet boating, kayak launch and retrieval, bank angling, and riverbank use) are predominantly secondary contact in nature. Secondary contact recreation involves activities where incidental water contact is possible (through spray, splashing, or accidental immersion) but where deliberate ingestion is not the norm. For the purposes of this assessment, the 0–40 m near-field mixing zone around the outfall is therefore assessed against secondary contact standards, consistently with the approach applied throughout Section 7.1.

This classification does not diminish the importance of managing effects in this section of the river. As recorded in the stakeholder interviews ([Section 6](#)), jet boaters, pack rafters, kayakers, and anglers all indicated that incidental primary water contact is routine, and that they apply a precautionary standard to water quality. The 'moderate' adverse effect rating assigned to the 0–40 m near-field mixing area reflects these expectations and is consistent with the public health risk assessment indicated illness probability of approximately 2% at the outfall margin under conservative low-flow, peak-discharge conditions, an upper-bound figure that falls within the 'Low Risk' category (Table 6) but which, in a high-use setting with sensitive community expectations, appropriately supports a 'moderate' effect rating.

#### *The 800 m downstream area as the relevant primary contact site*

The nearest location within the study area where primary contact recreation, specifically swimming, involving deliberate full-body immersion, occurs on a regular basis is the river margin below the Shotover Country residential development, accessed via the Twin Rivers Trail, approximately 800 m downstream of the proposed outfall. This site was identified in Section 6.3 through the ORC 2018 swimming survey (which recorded twelve responses for Kawarau River swimming concentrated in this reach), through stakeholder interview feedback from the Queenstown Trails Trust and Family Adventures Queenstown, and through field observation. It functions as an informal but well-used community swimming destination particularly during summer months, and falls within the study area defined by hydrodynamic modelling of the discharge plume.

The WCO (1997) requires the Kawarau River to be maintained to Class CR standard after reasonable mixing specifically for swimming and wading. The NPS-FM national target (Appendix 3, Policy 12) also requires at least 80 percent of specified rivers (including the Kimi-ākau/Shotover River as a fourth-order or greater waterbody) to be suitable for primary contact by 2030.

The critical question for this assessment is whether the proposed discharge would adversely affect primary contact suitability at the swimming site approximately 800 m downstream and after reasonable mixing. As detailed in [Section 7.1.1](#) and summarised in Table 4, the 95th percentile *E. coli* concentration at RS10 is 124 cfu/100 ml, which is well within the 'Excellent' (A/Blue) band under the NPS-FM human health criteria for primary contact recreation and is comfortably below the national bottom line of 540 cfu/100 ml. In contrast, the upstream Shotover site (RS04B) and the treated wastewater itself fall within the 'Fair' category (albeit is still considered A (Blue) band), confirming that the downstream Kawarau site at RS10 sits in a higher ("Excellent"), both are still suitable for primary contact recreation.

Under conservative modelling conditions, the treated wastewater fraction at RS10 and low levels of *E. coli* represents approximately two percent of the total water column. This finding supports the conclusion that the proposed discharge will not impair primary contact recreation quality at the 800 m downstream swimming area.

### *7.1.2 Effects on recreation access*

#### *Construction Phase*

During construction, temporary works areas, machinery movements, and safety controls have the potential to disrupt use of the Great Ride/Twin Rivers Trail and informal access routes to the river margin for angling and boating. Short-term closures, diversions, or localised narrowing of the trail corridor may be required near the outfall site, which could temporarily reduce convenience and quality of the experience for cyclists and walkers, and make access to favoured shoreline angling spots less direct. With appropriate measures, such as clearly signposted detours, maintaining a safe and rideable trail connection, scheduling the most intrusive works outside peak recreation periods where practicable, and retaining at least one safe access route to the shoreline, the overall effects on recreation access to the Twin Rivers Trail, the Kawarau river within the study area and the Shotover Delta during construction are expected to be temporary and no more than moderate.

#### *Operational Phase*

In the operational phase, the outfall structure and associated infrastructure are expected to have no ongoing requirement for maintenance works that would restrict movement along the trail or limit physical access to the river. Signage may be present advising recreationists to avoid the immediate outfall area and structure itself, but within the larger study area, this loss of area is minor. Provided the final design maintains continuity of the Great Ride/Twin Rivers Trail and retains or reinstates access paths to the shoreline for anglers and boat launching, long-term effects on recreation access are anticipated to be low to negligible. Routine inspection and maintenance activities should be infrequent and can be scheduled and managed in a way that avoids material disruption to trail users or to access for recreational angling.

### *7.1.3 Summary of Recreation Effects – Human Health Risk*

The scale of effects on recreation values are assessed according to the matrix in Table 8. This considers the magnitude of the effect and the value of the setting for recreation. The magnitude of the effect on recreation derives from the assessments by GHD on water quality and Boffa Miskell on ecological and landscape values, considering, for example:

- The spatial scale and duration of the effect;
- The magnitude or consequences of the effect occurring;
- The value of the organism or habitat affected for recreationally harvested species / activities; and
- The likelihood of the effect occurring.

Recreation value in this assessment correlates to the different levels of use of recreation setting (identified in Table 1) and the availability of alternative settings at the regional or national level (its significance at that scale, see Table 8). Commercial activities, such as jet boating in the Kimi-ākau/Shotover and Kawarau Rivers, are often of high significance

due to both their level of activity and because there is no alternative setting for them. Recreational jet boating has more flexibility in this regard.

**Table 8: Scale of impact on recreation values considering magnitude of effect**

		Recreation value			
		Very High	High	Moderate	Low
Magnitude of Effect	High or severe	Significant	Significant	Moderate	Minor
	Moderate or medium	Significant	Moderate	Minor	Minor
	Low or minor	Moderate	Moderate	Minor	Minor
	Negligible	Negligible	Negligible	Negligible	Negligible

A 'significant' adverse effect is one that would likely displace<sup>11</sup> most users away from a setting for extended periods. While this may not affect every activity that occurs there, the amenity value of the setting is likely to be diminished for all uses. A 'moderate' adverse effect would periodically exclude some users and activities but would not reduce amenity across the board. A 'minor' adverse effect would affect only a small number of users and only briefly, with amenity remaining largely intact for most activities and users. Where the affected area is limited in extent and comparable alternative locations are readily available nearby, the overall scale of effect may be lessened.

For settings with high or very high use, no minor scale of impact is recognised. This reflects the expectation, expressed through stakeholder interviews and consistent with the report author's professional experience, that heavily used recreation settings should be managed to an extremely low or negligible standard.

[Section 5](#) summarises the recreation activities undertaken as identified via literature review and interviews ([Appendix 1, Section 6](#)). Almost all activities are identified as no more than 'regionally significant', and none within the study area are considered nationally significant based on the WCO.

For primary and secondary contact recreation, the health risk effects are assessed as negligible to minor across all activities, reflecting the very low predicted *E. coli* and virus concentrations after reasonable mixing as established by GHD's (2026) water quality assessment. Where a minor effect is identified, this is limited to activities occurring within the 40 m immediate near-field mixing area downstream of the discharge structure. Beyond this zone, the risk of illness is assessed as negligible for all activities.

In summary, Table 1 (in the Executive Summary) illustrates that the proposed discharge activity will have a negligible effect for primary contact recreation in the study area, and a minor/negligible effect for secondary contact recreation in the study area when

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<sup>11</sup> Force people to recreate in other settings or not at all.

compared to a scenario where the current discharge is discontinued, and based on the conservative health risk assessment. Beyond the immediate near-field mixing area (40m) and downstream of the discharge, where very high use recreation occurs, there are unlikely to be any changes to real health risks from recreation due to the many other sources of contamination which affect the most heavily used parts of the study area (compared with both a 'no discharge' scenario and for the life of the proposed consent).

## 7.2 Effects on Fish and Angling

In terms of effects on aquatic ecology, Boffa Miskell (2026) found that habitat quality and macroinvertebrate communities along the Kawarau River are typical of a large, mobile, gravel-bed system, with all sites dominated by tolerant taxa and low to moderate diversity, and no evidence that historical wastewater inputs have caused a marked deterioration in overall ecological condition at the reach scale.

Although localised habitat at the proposed outfall site (RS11) is presently of marginal quality, with high deposited sediment and reduced invertebrate habitat, downstream habitat at RS10 remains sub-optimal but supports higher macroinvertebrate richness, fair MCI/QMCI scores, and a community consistent with wider Kawarau patterns, indicating that existing discharges (including from the DAD) have not measurably compromised invertebrate food resources or habitat important for recreational fish species.

For fish, Boffa Miskell's (2026) assessment confirms the presence of longfin eel, common bully, and introduced trout within the Kimi-ākau/Shotover and Kawarau Rivers, with no identified spawning habitat in the mainstem, and the proposed outfall replacing only a small area (c. 400–500 m<sup>2</sup>) of low-value cobble/gravel bed that is already limited as spawning or high-quality foraging habitat. Some spawning beds within the study area were noted through interviews with stakeholders, although no formal data is available to substantiate that claim. Therefore, this assessment relies on the conclusions of Boffa Miskell (2026), that any changes to macroinvertebrate composition and fish cover around the structure will be highly localised and ecologically insignificant at reach or catchment scale, and that the discharge is not expected to materially affect fish populations, prey availability, or habitats of importance for recreational angling in the Kawarau–Shotover system.

## 7.3 Effects on Access at the Outfall Structure

This section summaries potential effects on recreation access for both the construction and operation of the proposed WWTP (identified in Table 2).

### *Construction Phase*

During construction of the proposed underground pipe and outfall structure, temporary disruption to recreation access in the vicinity of the discharge point is anticipated. Construction activities are likely to involve machinery access routes, temporary works areas, and possible short-term detours affecting:

- Continuity of the Great Ride/Twin Rivers Trail at or near the river margin;
- Access routes used by shoreline anglers to reach preferred fishing locations; and
- Informal boat launching points at or near the confluence area (e.g., kayaking and packrafting).

The degree of disruption will depend on the construction methodology, programme, and duration adopted by GHD. Construction-phase access mitigations are to be confirmed once GHD's construction management details are received. However, to avoid a more than minor effect on regional recreation values, construction management should at minimum maintain continuous or clearly signposted alternative trail connections, schedule closures outside peak use periods where practicable, and retain safe access to the river margin for anglers and boat users wherever possible.

### *Operation Phase*

Once the outfall structure is operational, it will not alter physical access to, or use of, the Great Ride/Twin Rivers Trail or reduce the ability for anglers and boat users to reach the shoreline. The structure will be a rock covered, fixed, predominantly below-water feature at the river's edge, and provided the final design retains track connectivity to and along the river margin, ongoing operational effects on recreation access are assessed as low to negligible.

#### *7.3.1 Recreation: Operation Phase*

The following mitigations are recommended in relation to recreational use during operation and construction of the proposed discharge:

- Notification to recreation groups: Prior to commencement of discharge operations, relevant recreation groups and commercial operators, including jet boating companies, angling guides, whitewater sport operators, and the Wakatipu Trails Trust, should be notified of the proposed outfall structure and its location. This notification could be submitted to each recreation group (or governing organisation i.e., Whitewater NZ) by email and the QLDC website. Notification should clearly communicate the extent of the 40 m near-field mixing area, the nature of the health risk within that area, and the basis for concluding that risk beyond the zone is negligible.
- Exclusion zone signage: If outfall structure is constructed, signage should be installed at appropriate locations near the outfall to alert recreationists and discourage deliberate entry into the immediate discharge area. Signage should be clear, weatherproof, and consistent with existing river safety signage in the area.
- Rock access signage: Where the outfall structure involves rock features or modified riverbank, signage should be installed to discourage recreationists from climbing on or accessing the structure, for both safety and water quality reasons.
- Ongoing communication: Recreation groups should be kept informed of any changes to treatment performance or monitoring outcomes that may affect the health risk profile of the receiving water.

#### *7.3.2 Access: Construction Phase*

- Maintain continuous access for the Great Ride/Twin Rivers Trail for the duration of construction, either on the existing alignment or via a clearly marked, safe, and appropriately constructed, temporary detour.
- Clearly signpost any detours at both ends of the affected section and provide advance notice of changes to the Wakatipu Trails Trust and other relevant stakeholders.

- Maintain access to the river delta and adjacent shoreline for anglers, boaters and other users as far as practicable, limiting any temporary closures in extent and duration to specific works and activities and advising affected user groups in advance.
- As far as practicable, schedule the most disruptive works outside peak recreation periods (e.g., summer weekends and public holidays).

#### 7.4 Perceptual effects and their interaction with the effects matrix

The relationship between perceived and actual water quality has been examined in multiple contexts relevant to this assessment ([Appendix 2](#)). The effects matrix (Table 8) is based on measured and modelled water quality information, including E. coli concentrations, virus loads, health risk illness probabilities, and the spatial extent of the discharge plume. However, the evidence gathered for this assessment - through the literature review ([Appendix 1](#)) and the thirteen stakeholder interviews ([Section 6](#))- establishes that perceived water quality operates independently of measured conditions as a driver of recreational behaviour. This section addresses how perception effects interact with the matrix ratings and why, in the particular context of the Shotover–Kawarau receiving environment, they are relevant to the overall effects conclusion.

The summary of effects (Table 1) identifies a 'negligible' adverse effect in primary and secondary contact recreation areas within the 0–40 m immediate near-field mixing area (noting that assessment under the WCO and regional rules occurs after reasonable mixing). This rating was reached on the basis of conservative health risk modelling and the expectation, consistent with community feedback, that some users may avoid the immediate discharge area despite the relatively low modelled illness risk. The perception evidence supports and reinforces this rating; it does not, in this assessment, push the rating to moderate or significant. The reasons for this are as follows.

- First, the perception effects are most pronounced in the immediate vicinity of the discharge. At the Shotover Delta and the adjoining river margin, the physical presence of the outfall structure, any required signage, and the knowledge that treated wastewater is being discharged will influence the experience of users regardless of measured water quality. This is a real and material effect, but it is spatially contained. The rock outfall design, including the proposed planting and landscape integration, is intended to reduce the visual and olfactory footprint of the discharge, and these mitigations are relevant to the degree to which perception effects persist.
- Second, the perception evidence does not support elevating the effects rating in the 0–40 m immediate near-field mixing area, because a 'significant' effect is defined in this assessment as one that would likely displace most users from a setting for extended periods Table 8. The interview evidence does not suggest total displacement of the user community. Rather, it identifies a threshold of acceptability that is contingent on the discharge being well-managed, effectively treated, and transparently communicated. The majority of interviewees stated they would continue to operate or recreate if the upgraded system performs as modelled, provided treatment performance is maintained and monitoring results are openly reported. Conditional acceptance by most users is consistent with a 'moderate' rather than 'significant' rating.

- Third, and most importantly for the downstream reach, the perception evidence does not extend the spatial scope of the effects beyond what the modelling supports. The concern among interviewees about reputational damage to Queenstown's rivers as a whole (i.e., the 'poop in Queenstown rivers' framing) reflects a generalised anxiety about the district's environmental image rather than a prediction that users will avoid the Kawarau River at Gibbston, or the Shotover upstream near Tuckers Beach. Most commercial operators whose activities occur downstream of the reasonable mixing zone (e.g., the commercial rafting course, the river boarding operations below the Kawarau Bungy Bridge, KJet's downstream reach) confirmed they would continue to operate. The perception risk is therefore principally concentrated at the Shotover Delta node, not distributed uniformly across the study area.

## 8 Conclusion

This report assesses the impacts on recreation of the proposed long-term Shotover WWTP outfall discharge into the Kawarau and concludes that the proposed WWTP discharge to the Kawarau River will result in negligible health risk effects on recreation for all activities within the study area beyond the 40 m near-field mixing area, and at most a minor effect for activities involving immersion within the immediate mixing area adjacent to the true left bank of the Kawarau River itself (despite signage).

These conclusions are supported by GHD's (2026) hydrodynamic modelling and water quality assessment, which demonstrate that *E. coli* and other pathogen concentrations after reasonable mixing are well within accepted thresholds for primary and secondary contact recreation. Upstream catchment sources are identified as a more significant driver of water quality in the Kimi-ākau/Shotover and Kawarau Rivers than the WWTP discharge, and the proposed treatment upgrades, including tertiary filtration and additional UV disinfection, are expected to further reduce residual pathogen loads to below detection limits.

Effects on access are manageable through construction-phase mitigations, and operational effects are assessed as low to negligible with appropriate design controls.

The NPS-FM (2025) requires that water quality be maintained or improved for contact recreation, and that human health be safeguarded where freshwater is used for swimming and other primary contact uses. Within this framework, predicted *E. coli* concentrations at the primary contact sites downstream of the discharge will remain in the "Excellent" or A band, meeting the national bottom line of 540 cfu/100 ml (95th percentile), while quantitative health-risk modelling indicates low and acceptable infection risks from *Campylobacter* and norovirus.

These outcomes are also consistent with the WCO, which recognises the outstanding recreational, scenic and natural values of the Kawarau and its tributaries and requires water quality suitable for bathing after reasonable mixing. The assessment indicates that downstream water quality achieves the "Excellent" or A band for primary contact recreation, that health risk is negligible beyond the near-field mixing area, and that proposed treatment upgrades will further reduce pathogen loads, meaning the bathing standard set by the WCO is maintained. On this basis, the recreation values protected by the WCO, including jet boating, angling and whitewater sports, are not expected to be affected to a more than minor degree, and will be sustained, by the proposed discharge.

The RPWO sets an 80<sup>th</sup> percentile *E. coli* limit of 260 cfu/100ml for primary contact sites. Predicted concentrations after reasonable mixing (95th percentile of 29 cfu/100ml) are substantially below this threshold, demonstrating compliance with the regional plan standard. The discharge is therefore consistent with the RPWO's requirements for maintaining water quality suitable for the recreation values of the Kawarau River.

Finally, the study area is already subject to a range of existing modifications and the ongoing effects of the current emergency discharge to the Kimi-ākau/Shotover River. Because the WWTP proposes to discharge water of superior quality to that currently present in the Shotover the proposed discharge is not expected to further degrade the receiving environment. Considered cumulatively with existing modifications, the minor scale of the discharge structure and pipe and the minor to negligible health effects within

the near-field mixing area (and negligible effects beyond) mean the project will result in negligible additional adverse effects on recreation, and overall recreational use and values will be sustained.

Overall, the proposed discharge, together with the proposed treatment upgrades and recommended mitigations, is assessed as consistent with the requirements of the NPS-FM, the Regional Plan for Water for Otago, and the WCO in relation to recreation values and human health risk.

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# Appendix 1: Recreation attributes and existing recreation values: Literature Review

## National and Regional Recreation Participation

The Shotover Delta and its surrounding river corridors support a diverse and high-intensity suite of recreation activities, ranging from internationally recognised adventure tourism operations to informal, passive recreation by local residents and visitors. The following sub-sections describe the principal activities and the specific settings in which they occur.

Data describing and quantifying the recreation values of the Queenstown Lakes District is provided by QLDC’s *YE June 2025: Visitor Experience Survey* Figure 12. The survey found that the District is widely regarded as a premier destination for scenery-based, adventure and relaxation-oriented experiences. Fifty-nine percent of respondents noted that considered that natural environment the key driver to visit, while 27% and 24% noted respectively that adventure and sports and recreation were key drivers.

The survey found that 54% of visitors were walking/hiking, and 36% of visitors were participating in lake cruising and river activities. Cycling and biking came in with 12% participation. 76% of visitors or every 3 out of 4 also believe that protecting and restoring the local environment at a destination is important.

### ACTIVITIES/ EXPERIENCES

The most popular activities in Queenstown were dining out, shopping, sightseeing, and walking/hiking. International visitors participated in a broader range of tourism and adventure activities than domestic visitors.

Restaurants and cafes	84%
Shopping	66%
Sightseeing	61%
Walking/ hiking	54%
Lake cruising and river activities	36%
Bars/nightclubs	32%
Wineries or other wine experiences	25%
Art, museums, historic buildings	21%
Ski, snow, ice activities	20%
Adrenaline activities	18%
Wellness experience	15%
Farm, animal or nature experience	14%
Cultural or heritage experiences	13%
Cycling/biking	12%
Land activities	11%
Flying/air activities	9%
Community event/giving back	8%
Golf	4%

Figure 12: YE June 2025: Visitor Experience Survey

## Terrestrial Recreation

The Shotover Delta and its surrounding river corridor support a broad range of informal terrestrial based recreation. These include gold panning, picnicking, dog walking, and general passive amenity use of the river corridor. The Shotover River's gold panning heritage adds a layer of cultural and historical significance to informal recreation in this area, attracting visitors with an interest in both the natural environment and the region's colonial history. These activities are characterised by direct contact with or close proximity to the waterway, and participants are accordingly sensitive to any changes in water quality or environmental conditions.

### *Walking, Cycling and Trail Use*

The lower Shotover River corridor is traversed by the Shotover Gorge Trail, a Grade 3 intermediate trail extending 5.5 kilometres one way from Arthurs Point to Tucker Beach. The trail passes through the historic Hugo Tunnel and crosses the Kimi-ākau suspension bridge, providing users with sustained visual and physical engagement with the river environment. The Shotover Gorge Trail forms part of the New Zealand Cycle Trail Great Ride network and connects directly to the Twin Rivers Trail and the Tucker Beach Trail, both of which traverse the Shotover Delta area.

The Twin Rivers Trail is an 18.5 km Grade 3 shared cycling and walking route that closely follows the Kawarau River and the lower Shotover / Shotover delta area, forming a key part of the Queenstown Trail network. Starting at the Kawarau Falls Bridge, the trail drops down to the Kawarau River, then winds along the river's edge towards the Shotover delta where the Shotover meets the Kawarau, and continues across the historic Old Lower Shotover Bridge before following the Shotover and then back to the Kawarau toward Morven Ferry. In effect, it is the principal off-road access route by which large numbers of local residents and visitors experience the Kawarau-Shotover confluence, river margins and associated views, and it is heavily used for recreation, fitness, commuting and tourism.

Table 9: Queenstown Trails Trust: Trail counter data

Site	Total traffic	Daily Average	Average week days	Average weekend traffic
QT - Riverside Road	105,611	289	251	384

Site	Total traffic	Daily Average	Average week days	Average weekend traffic
QT - Old School Road	86,010	240	234	256

Site	Total traffic	Daily Average	Average week days	Average weekend traffic
QT - Billies Bridge	27,044	82	76	100

Queenstown Trails trust has trail counters at:

- Riverside Road – upstream of the delta
- Old School – Shotover Country side of the delta
- Billies Bridge – Access to well-used community beaches on the Kawarau.

Table 9 and specific sections. Figure 13 shows the distance between the proposed outfall and terrestrial areas of publicly accessible land.

Queenstown Trails Trust monitoring data reported in 2024–25 shows that the Twin Rivers Trail was the third most used trail in the Queenstown Trail network, with approximately 73,945 pedestrians and 69,678 cyclists recorded in that year (around 143,600 user movements in total). These counters do not isolate just the Shotover delta reach but they demonstrate that the Twin Rivers Trail, including the Shotover delta / Kawarau section, carries very high annual recreation use and is a significant contributor to the recreation and amenity values of the receiving environment.

At the district planning level, QLDC (2024) identifies the Lower Shotover/Kimi-ākau Trail, the Te Araroa Trail connection, and sections of the Countryside and Twin Rivers trails as recreation infrastructure in and around the Shotover Delta environs. These trail connections render the delta and its immediate surroundings a significant node in the regional active recreation network, attracting both local users and visiting cyclists and walkers seeking multi-day trail experiences.

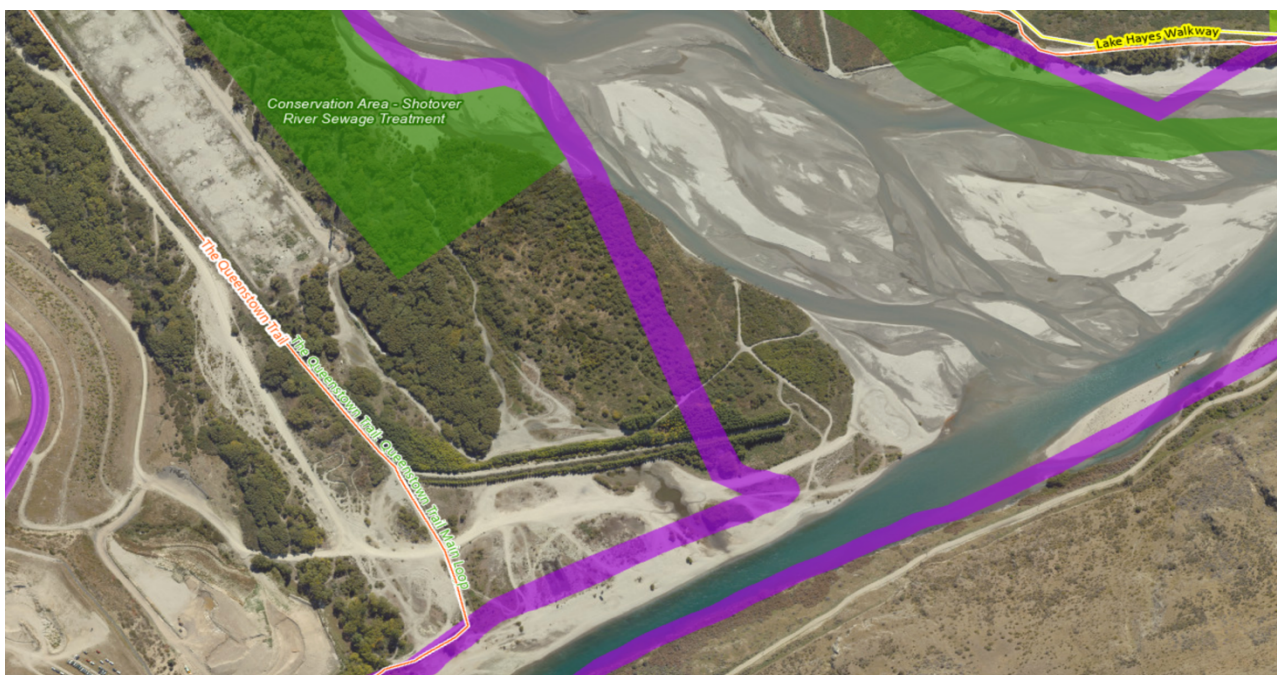


Figure 13: Walking Access Commission publicly accessible land near discharge and Twin Rivers Trail



Figure 14: Strava Heat Map (All cycle sports)

The “All Sports” option on Strava lets you record both terrestrial and water-based recreation. Figure 14 shows the Strava heatmap for ‘all cycling’ in the Shotover Delta/ Kawarau River area Figure 15 shows “all foot sports” (effectively May 2025-May 2026). Strava is a social media platform that utilises GPS data from users' smartphones and other devices, which is then uploaded to a central database. It enables individuals to track their performance, compare speed and time with other athletes performing the same activity, and monitor personal activity or training goals. While Strava is widely used by professional athletes, the majority of its users are recreational participants.



Figure 15: Strava Heat Map (All foot sports)

As of 2025, Strava reported having 125 million users registered worldwide, 80% of whom were outside the United States, with an additional million joining each month. The platform has since become particularly popular among regular cyclists and runners. Comparisons between different data collection methods indicate that Strava data is relatively reliable, with 1% to 12% of on-site users also recorded on the platform, a figure

that continues to grow. However, caution is needed when interpreting Strava data, as it reflects participation only among its members. This creates a bias toward more competitive and tech-savvy users, and some data may be skewed by users who remain logged in while engaging in other activities, such as driving. Additionally, GPS inaccuracies or map projection errors can cause location offsets by several meters, though most records are correctly positioned.

Heatmaps indicate the cumulative activity of Strava subscribers in any setting. The brighter the colour, the more activity there. The bright orange areas on both figures indicate the location of the Twin River Trail, which is a highly trafficked area. As noted in interviews, this trail is part of the New Zealand's Great Rides, and is also a key commuting route for residents and visitors, and one of the only direct routes to the Frankton and Queenstown from Lake Hayes residential estate.

### **Water based Recreation**

#### *Whitewater Activities (Rafting, Pack Rafting, Kayaking, Fun River boarding)*

Whitewater kayaking opportunities on the Kawarau River are well established, with four recognised runs-Dog Leg, Nevis Bluff, Waitiri/Citroen Rapids, and the Roaring Meg section-typically paddled at flows between 90 and 400 m<sup>3</sup>/s<sup>12</sup>. The Kawarau itself is heavily used by commercial operators, supporting activities such as rafting, kayaking, sledging and boogie-boarding. The Kawarau River is also commercially rafted, with an 8-kilometre course through the Gibbston Valley. The Shotover River is graded 3–5 on the international whitewater classification scale and is recognised as one of the highest-graded commercially rafted rivers in the world. RealNZ operates commercial rafting on the Shotover River from its base on the river banks at Arthurs Point. Both operations necessarily pass through or in proximity to the lower reaches of their respective rivers, including the Shotover Delta area, and both are subject to the same Class CR water quality requirements mandated by the WCO (1997).

Interview feedback highlighted that paddlers mainly use the areas near the confluence and proposed discharge as exit and entry points to the rivers, but predominately paddle downstream of the confluence or upstream on the Shotover River. The quality of the water environment, including its clarity, odour, and freedom from visible contamination, were noted as fundamental components of the recreation experience offered by these operators and recreational users. While Figure 17 illustrates only water-based recreation, and Figure 16 is specific to kayaking. This does not mean that other water-based recreation like jetboating, SUPing, and swimming is not occurring, but people are not regularly recording it through the app. Recreational boating and fishing activities are reviewed in later sections.

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<sup>12</sup> Charles, G. 2013. *New Zealand Whitewater 5. 180 Great Kayaking Runs. (5th edition) Graham Charles.*

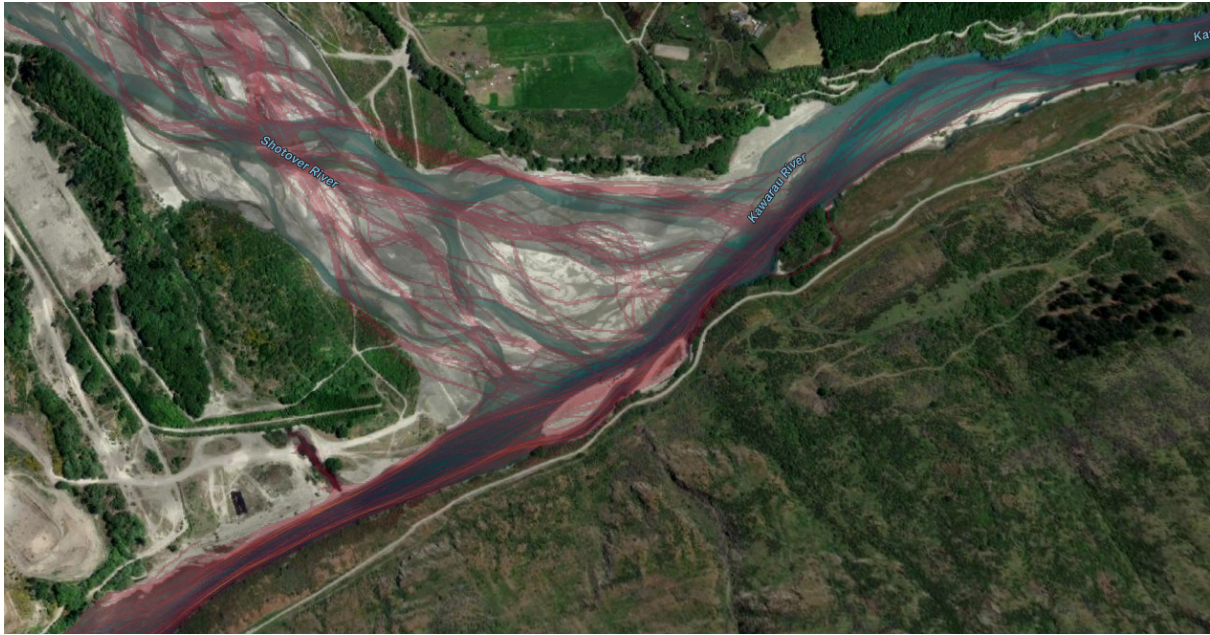


Figure 17: Strava Heat Map (All water sports)



Figure 16: Strava Heat Map (Kayaking)

In 1979 the NZ Canoeing Association published a national assessment of the scenic values of 64 rivers with recreation values (Egarr et al 1979). The assessment considered seven scenic qualities: vegetation, banks and riverbed, landscape, wilderness quality, water quality, water movement and ‘other qualities’; and ranked each attribute by river section using a five point scale (0 = dull and 5 = exceptional). An ‘exceptional’ river was identified when it gained a score of 16 or more, and included the Clarence, Kawarau, Hollyford, Grey and the Buller in the South Island. The Clutha River/Mata-au was assessed in five sections (Table 10), with the upper River scoring more highly than the lower, and the Kawarau as one section.

**Table 10: Clutha River/Mata-au scenic evaluation (Egarr et. al., 1979)**

Clutha River/Mata-au scenic evaluation	Vegetation	Banks and Riverbed	Landscape	Wilderness quality	Water quality	Water movement	Other qualities	Total
Lake Wānaka to Lindis	2	2	3	1	2	1		11
Lindis-Deadmans Point	2	2	3	1	2	2	1	13
Cromwell Gap and Dunstan Gorge	1	3	2	2	1	3	2	14
Roxburgh Dam-Pomahaka	2	2	2	1	1	1		9
Pomahaka-Sea	1	1	2	1	1	1		7
Kawarau	1	4	3	2	1	4	1	16

Although now several decades old, the New Zealand Recreational River Survey (Egarr & Egarr, 1981) is still frequently referenced in recreation assessments because it remains the only nationwide, site-based evaluation of river recreation values. Much of its detail is dated (particularly given the rise of plastic kayaks, commercial rafting, and modern creek-boating) but it continues to provide a useful benchmark for understanding the relative significance of rivers at a national scale.

The survey classified river sections into four value categories:

- **Category A:** Rivers with both outstanding recreational and outstanding scenic qualities.
- **Category B:** Rivers with outstanding recreational value and strong scenic qualities, or high recreational value paired with outstanding scenic value.
- **Category C:** Rivers with combinations of exceptional or high recreational value and scenic settings ranging from picturesque to moderate.
- **Category D:** Rivers with high or intermediate recreational value and scenic settings from moderate through to exceptional.

Within this framework, the Kawarau River was rated as having impressive scenic qualities and intermediate recreational value. This assessment was made before modern kayakers began regularly running the Nevis Bluff Rapids, which at the time were considered too difficult to navigate.

### *Jet Boating*

Recreational jet boating emerged and remains centred on South Island rivers with fast flows, confined gorges and braided reaches, with Canterbury, Otago and Southland collectively accounting for the majority of resident jet boaters and for much of the national river-boating effort. The QLDC Navigation Safety Bylaw 2018 uplifts the 5-knot rule (allowing jet boating) on the:

- Kawarau River upstream of the Arrow confluence, although no “waterskiing, aquaplaning or towing of persons” is permitted.

Jet boating New Zealand (JBNZ) classifies rivers into 4 classifications, providing boaters with awareness of difficulty levels and descriptive differentiation based on the skills required to successfully navigate a particular section of river. Table 11 shows the JBNZ River Classifications.

<b>Table 11: JBNZ River Classifications</b>	
<b>Class</b>	<b>Description</b>
<b>Class 1</b>	Easy boating, suitable for beginners and family boating. Boat damage unlikely. Deep water, braids with fine gravel, shingle, minor rapids only. In different flow conditions can encounter boulders, minor rock gardens, small but lively rapids or very shallow water.
<b>Class 2</b>	More advanced, comfortable after 100 hours experience. Contains challenges. Boat damage and risk of injury may result from misjudgements. Medium rapids, shallow water, complicated braids, some boulders/rocks, occasional willows.
<b>Class 3</b>	Adventure boating. Expert skills required. Boat damage/loss probable if mistakes made. Families not recommended. Crew and driver at risk if accident occurs. White water covers recommended. Maximum 2 persons/boat recommended. Challenging rock gardens, boulders, major rapids, chutes, willows, very shallow water.
<b>Class 4</b>	Unlikely to be boated. Impasses, waterfalls, no water.

The proposed WWTP discharge is located in the JBNZ classification area of the Shotover River. Table 12 is a breakdown of the sections, what the classification is for each section and any relevant comments.

<b>Table 12: JBNZ class Breakdown by River Section</b>				
<b>Section</b>	<b>Uplifting</b>	<b>Description</b>	<b>Launching</b>	<b>Comments</b>
<b>Kawerau River to Tuckers Beach</b>	Yes	Class 1. 6km Shallows, shingle, braided Gradient: 2.75m/km	As Below	
<b>Tuckers Beach to Oxen bridge Tunnel</b>	Yes, provided Shotover Jet permission obtained	Class 2. 7km Gorgy, rocks, shingle Gradient: 5m/km	Kawerau River or Tuckers Beach	Subject to QLDC Bylaw. Contact Shotover Jet (027 412 2982) to obtain permission and a permit.

<b>Oxen bridge Tunnel to Deep Creek</b>	No	Class 4. 12km Gorgy, rapids, rocks, shingle Gradient: 5.4m/km		
<b>Deep Creek to 100m above Skippers Bridge</b>	Yes	Class 2. 7km Shingle, gorgy Gradient: 2.9m/km	Under bridge at Deep Creek	
<b>Skippers Bridge to Sheil Burn</b>	No	Class 3. 21km Rocks, rapids, shingle, gorgy Gradient: 4.3m/km	As above	

The section of river for the study area is a class 1- *Easy boating, suitable for beginners and family boating. Boat damage unlikely. Deep water, braids with fine gravel, shingle, minor rapids only. In different flow conditions can encounter boulders, minor rock gardens, small but lively rapids or very shallow water.*

Galloway (2021) conducted a national survey on recreational jet boating values. Although the report does not break down use by individual river and or river section, the survey findings show relevant to this assessment are:

- Otago is one of the core destination regions for the activity, with 40% of surveyed jet boaters reporting recent travel to Otago and 63.4% having boated there at some point in their lifetime, indicating a strong pattern of inter-regional jet boat tourism into the southern river systems. Within this national context, the Kawarau River sits in a wider Clutha catchment that is heavily used by both private and commercial jet boaters for river-style “adventure boating”, family trips, and access to fishing and other recreation, with 75% of recreational jet boaters nationally spending most of their jet boating time on rivers rather than lakes.
- River settings with scenic gorges, swift flows and technical channels are particularly attractive to more involved jet boaters, who frequently travel beyond their home district (often on overnight trips) specifically to rivers with a good reputation for jet boating; more than half of respondents reported that they “always” or “very often” travel with particular rivers as a goal, and 52% expressed interest in greater involvement in the jet boating community.
- Recreational jet boaters place very high importance on being allowed to jet boat on a river, on having the 5-knot speed restriction uplifted, and on clean, unpolluted water and wilderness-like scenic qualities, and much lower importance on built facilities such as toilets and boat ramps.

Across the sample of 1,894 respondents, around 90% preferred to jet boat with “a few others” or “a group of jet boaters” rather than alone, and most reported travelling in groups to rivers with a strong jet boating reputation, reinforcing the importance of socially-shared river corridors such as the Shotover and Kawarau for club trips and informal group outings.

Research interviews with JBNZ acknowledged this area for hosting historically branch lead events and rallies<sup>13</sup>. Galloways (2021) study also notes that jet boating trips commonly integrate ancillary recreation – including angling, hunting and camping – using the boat to access otherwise hard-to-reach beaches, banks and side valleys, which is consistent with other stakeholder interviewees conducted for this assessment. Taken together, this evidence supports characterising the Kimi-ākau/Shotover as a nationally important recreational jet boating river where both commercial and private users depend on the retention of sufficient flows, water clarity and natural character to sustain the “freedom”, challenge and nature-based experience that participants identify as central to the activity.

### *Fishing and Angling*

The Kawarau River system and broader upper Clutha/Kawarau catchment support significant trout fisheries, offering angling opportunities across a range of methods, including spin fishing, bait fishing, and fly fishing, for anglers of all skill levels (Otago Regional Council, 2019). Fishing use is highest in the December to March period, coinciding with peak visitor season in the Queenstown Lakes District.

In regards to recreational fishing, according to the Sport New Zealand (2023) Active New Zealand Survey, fishing was the sixth most popular active leisure activity among New Zealand adults in 2023. The survey found that 19.8% of the adult population were interested in fishing, which includes both freshwater and marine fishing, during that year. Participation was 10.2% of the total population. The survey also reported on other outdoor and water-based activities. Swimming/Diving was ranked ninth and undertaken by 12% of New Zealand adults in 2023, making it a less common activity compared to fishing, but still notable among active recreation pursuits. Sailing and Yachting ranked 26th with 2.6% participation<sup>14</sup>

The eDNA results from the 2024 Landpro snapshot report confirmed the presence of 350 organisms in the water samples from the Kawarau and 340 organisms detected from the Shotover. Table 13 shows the most common fish species identified in the samples from both rivers. Interviewees reported that the majority of anglers, both residents and visitors, are fishing for both rainbow and brown trout, and salmon if it is present.

**Table 13: Fish species identified in Kawarau and Shotover rivers from Environmental DNA (eDNA) analysis**

Fish Species Identified in Kawarau River	Fish Species Identified in Shotover River
Common bully	Rainbow trout
Bullies	Brown trout
Common/Cran/Dinahs bully Gobies and sleepers	Salmon Common/Cran/Dinahs bully
Salmon	Longfin eel (tuna)

<sup>13</sup> Interview with Grant Wilson, JBNZ Otago Branch rep (2026).

<sup>14</sup> Sport NZ Insights Tool 2023, <https://sportnz.org.nz/resources/insights-tool/>

Rainbow trout	
Brown trout	
Longfin eel (tuna)	

Table 14 shows the estimates for both NZ residents and overseas angler days for the 2021/22 season (for “resident” and “non-resident” fishing licence class holders). The majority of “non-resident” fishing licences sold in 2021/22 – 84% – were for 24 hour periods, and which are usually arranged through a fishing guide (Unwin 2023).

**Table 14: Estimates of usage for all anglers by waterbody for the 2021-22 season as a whole**

Angling Water	Oct-Nov	Dec-Jan	Feb-Mar	Apr-May	June-Jul	Aug-Sep	Oct-Sep	Total
<b>Kawarau River</b>	7+/-3	472+/- 344	366+/- 222	11+/- 11	7+/- 3	5105+/- 5098	-	5969+/- 5114
<b>Shotover River</b>	-	1379+/- 1374	2+/-2	65+/- 63	-	-	-	1446+/- 1376
<b>Lake Wakatipu</b>	4745 +/- 1090	9185 +/- 2109	5432 +/- 1251	4048 +/- 1154	389 +/- 238	2459 +/- 912	9+/- 9	26267+/- 3069

Unwin (2023) notes, in reference to the popularity of water bodies in the Otago region, for the 2021/2022 season that,

*“The 19 most popular waterbodies...which together accounted for 82.5% of the total effort allocated to the Otago region during the 2021-22 season...The top five waterbodies/activities accounted for 49.1% of the total effort allocated to the region during 2021-22. Of the 20 most popular waterbodies/activities, 15 were within the Clutha catchment.”*

NIWA’s National Angler Survey (results 2021/22), prepared for Fish and Game New Zealand, shows that Otago consistently ranks among the most heavily fished freshwater regions in New Zealand, with rivers accounting for nearly half of total angler effort. The survey noted that the Kawarau River was within the top 20 most popular waterbodies within the Otago region to fish (5,969 +/- 5,114 angler-days). Table 15 illustrates the top 10 out of the twenty most popular waterbodies within the Otago regions during the 2021/22 fishing season, with the Kawarau River being the 8<sup>th</sup> most popular. The large lakes of the upper Clutha catchment comprised four of the top five most popular Otago fisheries of 2021-22 and together accounted for 39% of all angling effort in the Otago region during 2012-22.

**Table 15: Waterbody popularity 2021/22 season**

Catchment	Waterbody	Angler days )+/-se)	Cum. % of total
Clutha	Lake Wakatipu	26,267+/-3069	14.9
Clutha	Clutha River below Roxburgh trout	17,602 +/- 2358	25
Clutha	Lake Wanaka	16,162 +/- 1805	34.1
Clutha	Lake Dunstan	14,254 +/- 2152	42.3
Clutha	Lake Hawea	11,953 +/- 1886	49.1
Taieri	Taieri River Outram to Taieri Mouth	9,849 +/- 1659	54.7
Clutha	Manuherikia River	7,164 +/- 2228	58.7
Clutha	Kawarau River	5,969 +/- 5114	62.1
Clutha	Clutha River Clyde to Roxburgh	5,629 +/- 1090	65.3
Clutha	Clutha River Wanaka to Lake Dunstan	5,018+/-1088	68.2

### *Popular angling commentary*

Kent (2009), one of the most detailed trout-fishing guides for the South Island, along with Turner(2003), provides broad descriptions of angling opportunities across the waterbodies in Central Otago, although there is no F&G access brochures for the Kawarau. For the Kawarau River Kent (2009) states, “*Other spots to explore in the Queenstown area include the Kawarau River from the outlet down to the Shotover confluence. This is best fished from a drifting boat, and most trout are caught on spinners.*” Interviews with Fish and Game and a local fishing guide confirm Kents sentiments. Drift fishing occurs alongside the section of river where the proposed discharge would be located.

### *Values of angling in the Kawarau*

Unwin (2013) reported on the values associated with New Zealand Angling Rivers, of which they implemented nationally, using the method piloted in Unwin (2009b), albeit with slight amendments to the questions and reporting method (Table 16).

The Kawarau River was ranked (out of 57 popular rivers in Otago):

- 23rd for level of use,
- 33rd equal for importance,
- 12th for close to home,
- 31st for close to holiday home,
- 30th equal for ease of access,
- 37th equal for area fishable,
- 21st equal for scenic beauty,
- 29th equal for wilderness feeling,
- 42nd equal for angling challenge,
- 11th equal for anticipated catch rate,

- 17th equal for anticipate large fish.

**Table 16: Values of New Zealand angling rivers - Otago. (Unwin, 2013)**

Values of New Zealand angling rivers - Otago.	Total Responses	Mean Enjoyment Score	Close to home	Close to holiday home	Ease of access	Area of fishable water	Scenic Beauty	Wilderness Feeling	Angling Challenge	Anticipate good catch rate	Anticipate large fish	Other
<b>Kawarau River</b>	30	2.2	43 %	10 %	30 %	20 %	43 %	20 %	20 %	23 %	7%	0%
<b>Mean (all Otago Rivers)</b>	39	2.31	27 %	13 %	31 %	25 %	37 %	24 %	27 %	14 %	7%	4%
<b>Mean (all NZ Rivers)</b>	41	2.38	27 %	10 %	33 %	29 %	32 %	25 %	32 %	16 %	8%	4%

The mean scores including the following catchments:

- Clutha River/Mata-au (Wānaka to Lake Dunstan)
- Clutha River/Mata-au (below Roxburgh - trout)
- Clutha River/Mata-au (below Roxburgh -salmon)
- Hāwea River
- Kawarau River

The most recent survey capturing angler perception of Otago rivers was conducted for 2014/2015 season. A RiVAS assessment was facilitated via Niall Watson, of the Fish & Game Council Otago Region. Attributes for the assessment were based largely on those used in previous RiVAS assessments for angling (Greenaway, 2024). In the final assessment of significance, the panel weighted angler days by two to give a total possible score of 24. This recognised the significance of the popularity of the waterbody in describing its significance. Any score of 18 or more is considered regionally outstanding. The Kawarau rated a 14/24 and the Shotover a 9/24 (Table 17)

**Table 17: RiVAS angling – threshold scores, ranking and significance**

River	Reach	1. Angler days score	2. Overseas score	3. Perception of anticipated catch rate score	4. Perception of fish size score	5. Perception of scenic score	6. Perception of wilderness score	7. Mean enjoyment score	Weighted sum with Angler days*2 = total possible score or 24	Significance based on total sum scores: National is 17 or above; Regional is 13 to 16 inclusive; Local is 13 or less.
<b>Clutha River/Mata-au</b>	Shotover River	1	0	1	1	2	1	2	9	<b>Local</b>
	Kawarau River	2	1	2	1	2	2	2	14	<b>Regional</b>

### *Swimming and Water Contact Recreation*

Swimming occurs along the Kawarau River and in the Shotover River, with the main entrance areas (relative to the study area) below the Lake Hayes Estate residential development off the Twin Rivers Trail, approximately 800m downstream of the discharge. As noted above, the WCO (1997) requires the Shotover River and Kawarau to be maintained to Class CR standard specifically for swimming and wading, establishing a clear legal expectation of safe water contact conditions in this reach. The potential for the proposed discharge to affect perceived or actual water quality in this zone represents a significant consideration in this assessment.

ORC conducted a survey in 2018 of all swimming activity across the region. The survey relied on a self-selected sample of respondents who answered a simple set of questions about swimming location and quality, and indicated their swimming sites by dropping a pin on an online map. Not all pins were dropped accurately but over 1000 response were gained, which should give a reasonable indication of the main swimming locations and issues, at least at a relative level. Figure 18 illustrates the survey results in totality, with the highest reported use rates for Lake Dunstan, Lake Wakatipu, and Lake Wanaka. For the purpose of this assessment, it is best to consider those locations that are in and or near the WWTP. There were 12 responses for swimming on the Kawarau River, located mostly downstream of the Shotover confluence near the Ladies Mile subdivision, and two near Gibbston. The River also scored an average of 3.8 (almost ‘very good’). There was no rating below 3 and the relatively middling score resulted from concerns over water speed, a lack of amenities for swimming and jet boat activity, although half of the respondents noted the River offered good, clean swimming spots.

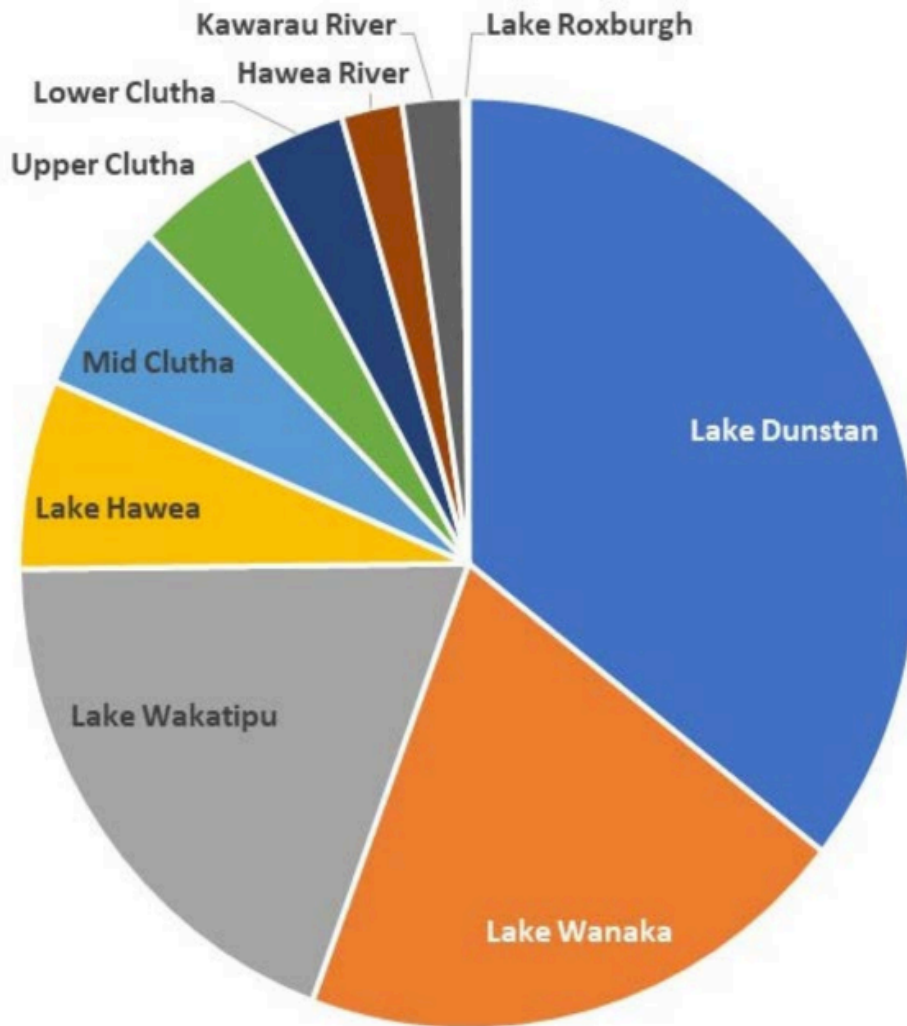


Figure 18: ORC Swimming survey, response by water body

Across 105 responses, Lake Wakatipu was rated very highly as a swimming location, averaging 4.3 out of 5. The mapped responses show a mix of precise pin-drops and more general indications of swimming somewhere on the lake. Key areas to note are the pins close to or on the Kawarau, near the Shotover confluence. Only a small number of ratings fell below 3, and these tended to relate to temporary or localised issues such as low lake levels, patches of weed, duck itch, litter, crowding from people or boats, or concerns about water quality.



Figure 19: Swimming records Lake Wakatipu-specific swimming sites (ORC 2018)

## Appendix 2: Perceptions of Water Quality

### *Otago Regional Council consultation for water quantity plan*

The Greenaway (2024) recreation values assessment for the Otago Regional Council (ORC) to support the review of the *Regional Plan: Water for Otago* informed the development of minimum flows, water-level requirements, and allocation limits for the Clutha/Mata-Au, Hāwea and Kawarau Rivers, and Lakes Dunstan, Roxburgh, Hāwea, Wakatipu and Wānaka. As part of his assessment, Greenaway drew on ORC's earlier consultation undertaken between November 2017 and February 2018, which sought community input to guide the water-quantity plan change. The consultation highlighted the breadth and importance of recreation across the river and lake system. The Kawarau River near Queenstown was highlighted as:

- A high-use corridor for commercial and non-commercial recreation.
- A location where water clarity and scenic quality strongly influence visitor experience.
- An area where motorised and non-motorised recreation overlap, creating occasional tension.

Concerns raised included:

- Growth in motorised boating (jet skis, jet boats) leading to noise, safety concerns, and perceived water-quality impacts.
- Water quality issues as a result of:
  - Increasing pressure from tourism and urban development affecting the natural character and recreational feel of the river corridor.
  - The spread of nuisance weeds such (i.e., lagarosiphon, algae, and didymo)

Others observed that water quality issues were more pronounced downstream of Cromwell. These changes were commonly attributed to urban growth, expansion of primary industries, increased tourism, and the cumulative effects of hydro-electric generation.

### *Otago Regional Council Survey: Waterways research: qualitative and quantitative findings*

Otago Regional Council undertook a waterways research study combining qualitative and quantitative methods to assess water quality across the region (Versus Research, 2016). While the study encompassed the entire Otago region, the following summary focuses on the Queenstown Lakes District and provides insight into how residents perceive and interact with local waterways, including those within the study area.

- Queenstown Lakes respondents reported the most positive perceptions of water quality in the region, with 62% rating it between 7 and 10 out of 10. These perceptions were strongly informed by visual and experiential indicators, including water clarity, perceived drinkability, the presence of healthy fish and plant life, and suitability for swimming.
- High levels of recreational use reinforce the importance of these attributes. Residents frequently engage with lakes and rivers for activities such as relaxing by the water (78%), sightseeing (64%), swimming and paddling (63%), walking (60%), picnicking (53%), cycling (53%), tramping (49%), camping (40%), and fishing

(40%). This level of use highlights the importance of maintaining clean, visually appealing waterways that support everyday recreation.

- Despite generally positive perceptions, respondents identified specific concerns relating to visible degradation. When asked why certain waterways were considered to have poor water quality, the most common reasons were rubbish and pollution (25%), the presence of faeces (15%), and poor clarity or cloudy water (22%). Concerns were also linked to perceived high nutrient or bacterial levels (19%), indicating that both visible and inferred indicators influence public judgement.

The study also assessed the importance of different waterway attributes using stated and derived importance measures. Stated importance reflects attributes that are top-of-mind for respondents, while derived importance identifies underlying drivers of behaviour. Derived importance analysis (across all rivers and streams in the region) indicates that recreational suitability and accessibility are the most influential attributes affecting how residents interact with waterways (Figure x). This aligns with stated importance results, where suitability for recreation (38%) and accessibility for all users (30%) were prioritised. Overall, perceptions of water quality are a key determinant of recreational participation.

Finally, the study showed that for the QLDC, the district perceptions of all water were rated poor: the Queenstown Lakes residents ratings were:

- Overall Poor - 16%
- Poor clarity/ cloudy water-40%
- Algae/ rock snot-32%
- Not swimmable/ drinkable/poor taste 29%
- Poor smell-29%

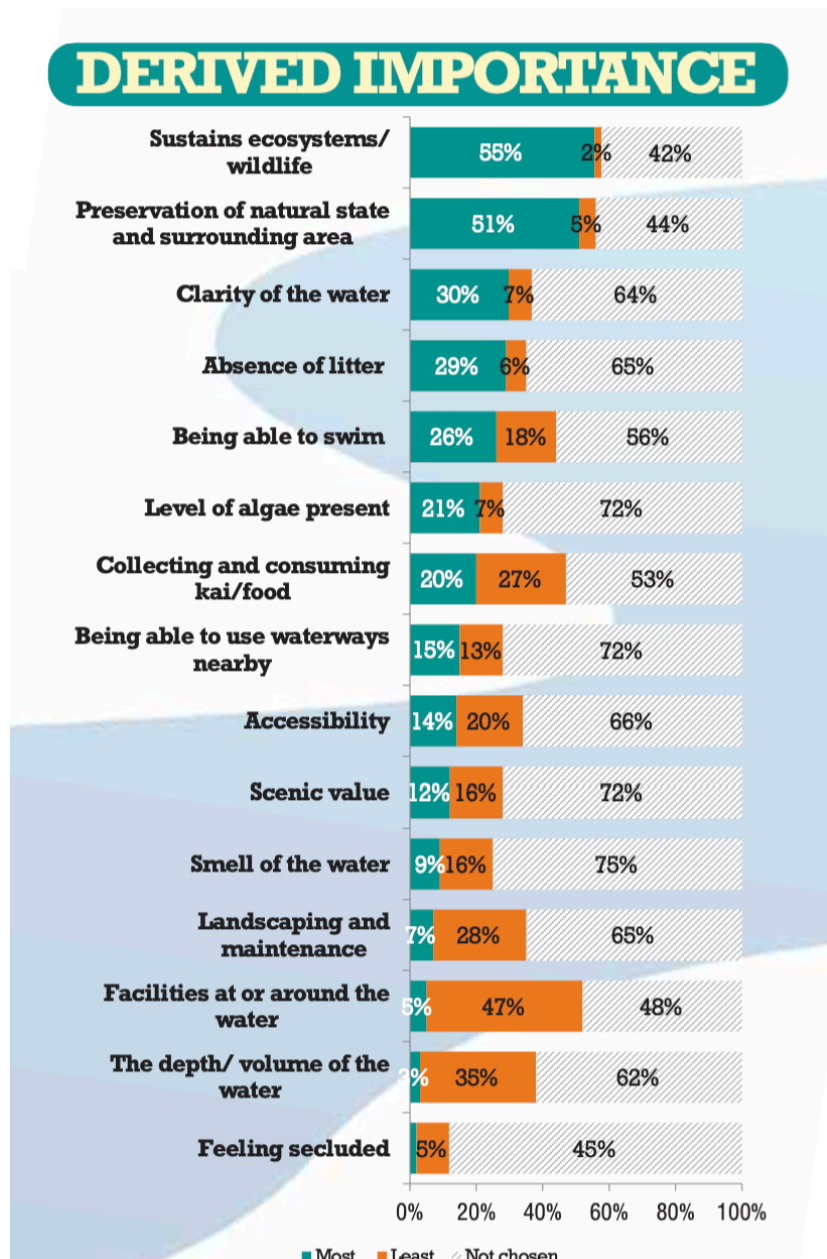


Figure 20: Derived importance of all rivers and stream in Otago (ORC, 2018)

- Rubbish/ pollution-22%.
- And treated wastewater and water quality both scored 16% of all district concerns for the QLDC.

#### *Literature on water quality perception*

There is strong evidence that perceived water quality-independent of measured conditions-significantly influences recreational behaviour. Flotemersch and Aho (2020) found that public use of aquatic environments is highly responsive to perception alone. This has important implications in the context of wastewater discharge, as even compliant discharges may deter users if the presence of treated wastewater is known. This is particularly relevant for primary and secondary contact recreation activities, including swimming, angling, and jet boating.

In the Shotover Delta context, this relationship between perception and behaviour is especially significant. The Kimi-ākau/Shotover and Kawarau rivers form a significant part of Queenstown's adventure tourism offering for water-based recreation activities and support a substantial visitor economy. The sensitivity of this environment to perceived water quality is underscored by prior non-compliance events at the Shotover wastewater treatment plant, where E. coli discharges attracted significant public and media attention. These events demonstrate how rapidly recreation patterns and community confidence can respond to perceived water quality issues.

Experimental research in New Zealand further highlights the importance of visual indicators. Smith and Davies-Colley (1992) found that perceptions of suitability for bathing and aesthetic enjoyment are highly sensitive to water clarity and colour. Using black-disk visibility, water is perceived as only marginally suitable at approximately 1.0–1.1 m and becomes suitable at around 1.6–1.7 m, with a sharp transition in perception between 0.8 and 1.2 m. Water colour also influences perception, with yellow hues regarded as poor, green-yellow as marginal, and green to blue tones preferred. For clear, glacier-influenced rivers such as the Kawarau and Kimi-ākau/Shotover, even modest reductions in clarity or shifts toward a more turbid or yellow appearance are likely to be perceived as a decline in quality, regardless of whether ecological thresholds are exceeded.

The receiving environment is further characterised by a high degree of sensitivity due to statutory protections. The Water Conservation Order (1997) Class CR standard requires water quality to be maintained for contact recreation, including swimming and wading, with particular emphasis on clarity, visual quality, and the absence of undesirable biological growth (WCO, 1997). Any discharge that adversely affects these attributes, even temporarily or locally, may be inconsistent with the values for which these rivers are protected.

Kreitler et al. (2013) found that poorer water quality reduces participation and diminishes recreational ecosystem services. Oliver (2025) further highlights the challenges of managing bathing water quality at the science-policy interface, particularly in balancing measured and perceived conditions. These findings are directly relevant to the study area as both rivers host commercial and non-commercial recreation, which is highly dependent on maintaining high water quality.

Social research also indicates that perceptions of water quality vary according to user characteristics and recreation patterns. Barnett et al. (2018) found that frequent users of water-based environments tend to hold more positive overall perceptions but are also more sensitive to signs of degradation. This was supported by most interviewees noting that when the quality of the water was to shift, they noticed immediately. Different user groups may prioritise different aspects of water quality, with anglers and nature-based users typically expressing greater concern than boaters.

### Appendix 3: Contact List

Organisation	Interviewee/s
Central Otago Whitewater Club	Roy Bailey
Serious Fun River boarding Ltd.	Neil Harrison (owner)
Whitewater NZ	Shayne Galloway (nominated contributor)
Family Adventures Queenstown	Mark Forsyth
Pack Rafting Queenstown	Huw Miles
Kawarau Jet Services	Brett Fitzgerald & Karen Thomsan
RealNZ / rafting operator	Gavin Morphet
Fish & Game Otago / regional office	Nigel Paragreen and Mason Court
NZ Jetboat Association	Grant Wilson (Otago Branch Chairman)
Unreel Fishing-Fishing Guide	Mike Johnson
Queenstown Trails	Mark Williams and Kat Bulk
Shotover 4WD Club	Jake Gregory
Queenstown Kayak Club	Steve Norton

## **Appendix 4: Stakeholder Interview Summaries**

Thirteen online TEAMS interviews were completed with recreation and tourism users and managers of the extended study area. Where relevant information was gained, interview summaries were written and sent to the interviewee for editing and confirmation. WhitewaterNZ also submitted via the formal submission process. Thirteen written summaries are included below.

### **Mark Williams and Kat Bulk, Queenstown Trails Trust, CEO and Comms Manager**

The Queenstown Trails Trust described extensive recreational use of the Shotover–Kawarau corridor, with the Twin Rivers Trail (a nationally recognised Great Ride) forming the core of their involvement. Peak use occurs from December to mid-March, although the trail network is used year-round by both locals and visitors. YE June 2025 there were 480,808 total trips across the trails in Queenstown. Mark and Kat emphasised that the trail is promoted as a “world class cycling experience”, yet the section passing the Shotover Delta currently falls short of that standard due to the presence of the failed treatment ponds and associated odour and visual effects. The trail is heavily used for cycling, walking, and mountain biking, and its proximity to residential communities such as Lake Hayes Estate and Shotover Country makes it a key local recreation asset. The Trust noted that the trail also provides access to popular beaches downstream of the confluence, where families swim, play in the silt, and walk dogs. They highlighted that this is the only trail on the true left of the Kawarau, and that an earlier proposal for a bridge to Kelvin Heights would have expanded connectivity but has not progressed.

Several access points and adjacent areas were identified by the Trust as important to trail users, including the Twin Rivers Trail itself, the Shotover Delta Road, and the informal motocross zone used by the local dirt-bike community. They explained that this area is one of the few legitimate off-road motorbike spaces available, and that reinstating it after construction would help avoid displacement to inappropriate locations. Downstream of the confluence, community-built single-track trails (such as the COVID-era “Sweet Robby” trail) remain well-used and form part of the wider recreation network. The Trust stressed that uninterrupted access is critical, particularly during construction, noting that the trail is a major commuting route and “the only safe off-road way to get to the high school from the eastern side”.

Water quality plays a meaningful role in how users experience the trail, as the route forms part of the district’s “blue-green corridor” where interaction with the river is integral to the experience. They shared that on hot days, people frequently ride to the beaches downstream of the confluence to swim, and upstream areas near the confluence are also popular for swimming and camping. While the Trust has not received formal complaints, they acknowledged ongoing community “chit chat” and “fear and perception” around water quality, particularly given the visible discharge outfall into the Shotover, signage, and the degraded appearance of the failed ponds.

Regarding the proposed discharge of treated wastewater at the Shotover Delta, the Trust considered that recreation would continue, provided the infrastructure is largely invisible. They noted that “all underground pipes”, no smell, and no drainage fields would significantly reduce negative perceptions. However, they cautioned that required signage indicating treated wastewater discharge could have a substantial impact on user

experience, describing it as “*a real big impact on their enjoyment of the trail*”. They also expressed concern about the current contaminated-feeling environment, noting that walking through the area can make people “*feel dirty even... knowing that you’re not in contact with it*”. They emphasised that the long-term solution should aim to restore the area to a more natural state, removing chain-link fencing, barbed wire, and the visual legacy of the failed ponds.

The Trust’s key request, should the discharge proceed, is that the area be restored to a natural environment, including rehabilitation of the failed treatment ponds and improvements to the landscape character of the trail corridor. They also asked for clarity on the short-term construction impacts of installing the new pipe and whether the retired ponds could be repurposed or restored to enhance the Great Ride experience. No additional recreation interests were identified beyond these considerations.

### **Grant Wilson, Otago Branch, JBNZ**

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The NZ Jetboat Association (Otago Branch) uses the lower Shotover–Kawarau system extensively for recreational jet-boating, including launching from the Shotover Delta area on the true right of the Shotover River and travelling throughout the proposed discharge area. The Delta is a key gathering point for members and is occasionally used as a base for the annual Otago Branch rally, which rotates around the region and was last held at this site in 2021. Shotover Delta Road provides the primary access point for members, and the launch area sits within approximately 500 metres of the proposed discharge location. Because alternative access points in the district are limited, maintaining uninterrupted access to the Delta is considered essential for club members.

Water quality is a major factor influencing participation for JBNZ members. Grant shared that members have observed the existing outflow into the Shotover, noting concerns about “colour and smell” during the December 2025–March 2026 period. The Association highlighted that both actual and perceived water quality strongly affect willingness to launch and boat in the area, particularly at the Delta where users are in close proximity to the discharge point. A “perceived lack of infrastructure” and uncertainty about future wastewater capacity were also raised as contributing to member concern.

In relation to the proposed long-term discharge to the Kawarau River, the Association identified several potential effects on recreation. Any “sign of discolouration, odour issues, or visual water quality issues” would deter members from boating in the area. While jet-boating occurs year-round, summer is the period of highest use and therefore the most sensitive to changes in water quality or public perception. Members emphasised that even if the discharge meets health standards, negative perception alone could influence participation.

If the discharge proceeds, the Association wants to see high regulatory standards, robust treatment processes, and transparent reporting. They stressed the need for open and timely communication, including rapid notification of any non-compliance, ongoing monitoring, and a clear plan for continuous improvement of wastewater quality over time. Protecting access and ensuring the long-term health of the river environment were identified as core expectations. No additional recreation interests were identified beyond general river users, although the Association noted that the area is shared by a

wide range of boaters, swimmers, anglers, and other recreation groups whose interests should also be considered

### **Mike Johnson, Owner Operator, Unreel Fishing Charters**

Unreal Fishing Charters primarily uses the lower Kowarau River for guided fishing experiences, launching from the Frankton Marina and drifting downstream through the full extent of the study area. Mike explained that they “drift through the entire orange bit in the study area”, moving from the Shotover mouth past Lake Hayes Estate and, when river conditions allow, continuing as far as Swift Falls. They do not travel up the Shotover River itself but regularly fish the Kowarau reach from the confluence downstream, targeting rainbow and brown trout. This area includes several important trout spawning locations, particularly the “top part of the study area-key trout spawning areas”, with spawning occurring from May through to the end of August. Mike identified multiple spawning beds, including small-gravel patches just upstream of the confluence and around the gravel island on the Remarkables side.

Access to the river is essential for the charter operation, and uninterrupted ability to drift downstream is described as “crucial.” Although they do not disembark along the river margins, the ability to move freely through the reach is fundamental to the experience they provide. Water quality is also a significant factor, both for the health of the fishery and for client safety. Mike noted that “*anywhere there is small gravel is a spawning area*”, underscoring the sensitivity of the habitat. He also referenced past E. coli issues downstream of the Shotover, which heighten concern about potential contamination. When considering the proposed discharge of treated wastewater at the Shotover Delta, Mike’s primary concerns centred on fish health, angler safety, and public perception. He questioned “what is it going to do to the fish” and raised issues around secondary contact, such as handling fish with wet hands, cuts, or accidental ingestion of water. He noted that if there were any meaningful health risk, either to people or to the fishery, he would not be able to operate in the area. Public perception was also identified as a potential barrier to client bookings, even if the actual health risk is low.

If the discharge proceeds, Mike emphasised that the river must remain “clean and safe” and that conditions should remain as they are now (i.e., no smell, no visible change, and no degradation of the fishing experience). He also stressed the importance of protecting the spawning beds, which are directly upstream of the proposed discharge location. No additional recreation interests were identified beyond the spawning areas already discussed. Overall, the key considerations for Unreal Fishing Charters are fish health, angler safety, and maintaining the natural character and water quality that underpin the fishing experience.

### **Gavin Morphet, Wakatipu Lake Manager, Real NZ**

RealNZ currently uses several parts of the Shotover–Kowarau system for its commercial recreation activities, including jet-boating, rafting, and occasional float trips. Their primary operations occur on the upper Shotover near Skippers and along the 7 km reach downstream to the Arrow River, with some guests jet-boating from Lake Wakatipu through the confluence area. RealNZ also operates float trips under KJet’s consent, drifting from the Shotover–Kowarau confluence to the Arrow River. While they do not routinely use the Shotover Delta itself, the confluence and downstream reach form part of their broader recreation network.

Access points are important for RealNZ, particularly the launch areas used for float trips. Gavin noted that there is “potential to launch near Lake Hayes”, although this would require navigating residential areas and is not currently preferred. Water quality plays a meaningful role in customer experience, especially for primary-contact activities such as rafting, where guests expect the “pristine Queenstown turquoise blue” water. He noted that jet-boating involves occasional splashes, but rafting includes deliberate water immersion, making clarity and perception of cleanliness important for participation. Regarding the proposed discharge of treated wastewater at the Shotover Delta, Gavin stated that RealNZ would continue to operate, as the scientific modelling and mixing zone indicate no significant health risk by the time water reaches their activity areas. However, he emphasised that public perception is the biggest operational risk, noting that “*it only takes a couple of bad media releases*” or misinformation to influence last-minute bookings, particularly for rafting, which has a very short lead-in time. He also raised the issue of upstream back-eddies reported by divers, which may need to be considered in final design.

If the discharge proceeds, Gavin stressed the need for clear public information explaining the treatment process, the science behind the discharge, and why the system is designed the way it is. He also highlighted the importance of having a transparent plan for managing any failures or spills, stating that operators need to know “what the plan is for a fail” so they can respond appropriately. Finally, RealNZ would like to see ongoing monitoring of the discharge, with results shared regularly with tourism operators and recreation groups. This transparency would help maintain confidence, support accurate communication with visitors, and mitigate the risk of misinformation affecting participation.

#### **Brett Fitzgerald and Karen Thomson, Kawarau Jet**

KJet operates extensively across the Shotover–Kawarau system, running jet-boat trips from Queenstown Bay and the Frankton Marina down the Kawarau River, through the confluence, and upstream toward Tucker Beach. The organisation uses the full extent of the study area as its primary operating area, travelling both upstream and downstream and occasionally allowing passengers to disembark at specific riverbank locations. KJet runs year-round, with December to April being the busiest period, carrying approximately 90,000 passengers per year.

Water quality and public perception are central to KJet’s operations. While the company has long operated in the Shotover where treated wastewater is already discharged, KJet noted that water quality feedback has “gained traction” in the last six months. They emphasised that their customers expect to experience “clean, pristine water”, and that negative perception, regardless of actual health risk, can influence bookings.

Regarding the proposed discharge of treated wastewater at the Shotover Delta, KJet stated that they would continue to operate if the water is safe and meets health standards, but the greatest risk lies in public perception. They expressed concern that even scientifically sound treatment processes may be overshadowed by community sentiment, noting that “public perception is huge” and that negative coverage could lead

to loss of business. They also highlighted the operational challenge of relying on delayed water-quality test results, which makes it difficult to stay ahead of any spikes or incidents.

If the discharge proceeds, the organisation would want frequent water-quality updates, clear public communication about treatment processes, and transparency around any failures or spills. They stressed the need for a defined response plan outlining what happens if treated wastewater quality drops or if a system failure occurs, as this directly affects customer safety and business continuity. Finally, KJet noted that the community is highly invested in the issue and may react strongly to the idea of treated wastewater entering the Kawarau, even if the science demonstrates minimal risk. They emphasised that ongoing monitoring and regular reporting to tourism operators would be essential to maintaining confidence and mitigating misinformation.

### **Mark Forsyth, Co-owner, Family Adventures Queenstown**

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Family Adventures Queenstown operates exclusively on the upper Shotover River, running family-friendly Grade 1–2 trips from Skippers Canyon through to Deep Creek. They confirmed that “no commercial use of the lower downstream” occurs for their business, and therefore they do not operate within the Shotover Delta or Kawarau confluence study area. However, in their personal capacity as a whitewater user, they noted that the downstream reach from the Shotover–Kawarau confluence to the Chinese Dog Leg (Rafters Road) is regularly used by kayakers, rafters, and swimmers. They also highlighted that the public frequently swims approximately half a kilometre below the confluence near Lake Hayes Estate, describing this as a popular and well-used summer recreation spot.

Several access points were identified as important for public and whitewater use, including the Shotover Delta confluence, access tracks from Lake Hayes Estate, and informal access along the Shotover Country river edge. While these are not essential to Family Adventures’ commercial operations, they are significant for the broader whitewater and recreation community.

Water quality was described as a major factor influencing user experience, particularly in the upper Shotover where clients frequently comment on “how clear and pretty the water is”. Primary-contact activities such as swimming and rock jumps rely heavily on both actual and perceived water quality. Although Mark had not personally received formal complaints, they acknowledged that water clarity and aesthetic quality strongly shape public confidence and willingness to enter the water.

Regarding the proposed discharge of treated wastewater at the Shotover Delta, the interviewee noted that there would be no direct operational impact on Family Adventures Queenstown, as they do not use the affected reach. However, when speaking as a whitewater recreationist, they emphasised that safety and health risk are major considerations, alongside the broader issue of public perception. They recognised that the treatment upgrades and fast-flowing discharge location are intended to minimise health risks, but reiterated that perception of water quality could still influence recreation behaviour and community sentiment. If the discharge proceeds, the interviewee stated that they would want to see clear signage indicating any health risks

(if applicable) and assurance that public access across the study area remains safe and uninterrupted. No additional locations or issues were raised for consideration.

### **Nigel Paragreen and Mason Court, Fish and Game (Otago Branch)**

Fish & Game representatives described the lower Shotover–Kawarau system as an important and well-used angling area, particularly for local residents who value its easy access and year-round fishing opportunities. While they do not hold formal spawning records for this reach, they noted that the habitat contains “suitable gravel and suitable environment” for trout spawning, and that the absence of recorded data reflects limited survey coverage rather than an absence of spawning activity.

The Shotover Delta and the reach immediately upstream of the confluence are popular fishing spots, used for casual evening angling, family-oriented events such as youth clinics, and more serious angling targeting trout at the mixing zone of the two rivers. Both the Kimi-ākau/Shotover and Kawarau can be fished year-round, with activity increasing through winter when other rivers close.

Access was identified as a critical factor for Fish & Game members. Shotover Delta Road provides the most direct and widely used access point, supplemented by entry from the Twin Rivers Trail. The organisation emphasised that enduring, uninterrupted access is essential, noting that anglers strongly value the ability to reach the river without restrictions, closures, or permission requirements. Any loss or disruption of access can quickly deter participation.

Water quality was also noted as a major influence on angler behaviour. Many anglers fish “for the table”, making both actual and perceived water quality important for confidence in eating their catch. Wading, handling fish, and frequent splash exposure mean that primary-contact safety is also a concern. Fish & Game noted that “perception is the reality” for many anglers, and that negative assumptions about water quality, regardless of scientific evidence, can deter people from fishing.

Regarding the proposed discharge of treated wastewater at the Shotover Delta, Fish & Game identified several potential effects. The proposed outfall structure may result in the loss of a small beach currently used by anglers and could create a new “hotspot” where fish congregate due to added structure and flow refuge. This may attract both trout and smaller species, altering angling patterns. They also raised concerns about anglers climbing onto the rock outfall structure to fish, highlighting the need for clear signage to prevent unsafe or inappropriate use. The mixing zone itself is a popular fishing location, and any exclusion area, if required, could displace anglers from a valued site.

If the discharge proceeds, Fish & Game stated that their overarching interest is protecting public health, fish health, and the integrity of the fishery. While they are participating in the process, they have not lodged a formal submission and noted that their council generally prefers no discharge to water where possible. They emphasised the importance of ensuring that “everything that can be done is being done”

### **Huw Miles, Queenstown Packrafting**

Huw Miles has lived in Queenstown since 2007 and has been an active river guide on the Kimi-ākau/Shotover and Kawarau Rivers for nearly two decades, working as a river boarder, kayaker, pack rafter, rescue instructor, and operator of a packrafting company.

He noted key sections used include Nevis Bluff, the Dog Leg (above the Bungy), Rafters Road, Citron Rapid, Roaring Meg, and downstream reaches into the Clutha. Use occurs daily, particularly during spring and summer, though recreation continues year-round. Access points downstream of the proposed discharge are critical, with established put-ins required for heavier craft, while pack rafters utilise any accessible river entry.

Water quality is a major determinant of participation. Huw noted that poor water quality elsewhere in New Zealand has resulted in hospitalisations, and he emphasised the significant reputational risk associated with any perception of contamination in Queenstown's rivers. He stated that "*people won't remember the details, but they will remember there's 'shit in Queenstown rivers,'*" highlighting that public perception, regardless of scientific evidence, would strongly influence behaviour across all local rivers, not just the Kawarau. He also noted that film projects have already been relocated due to concerns about water quality reputation.

Huw believes the proposed discharge of treated wastewater would have a 100% impact on perceived safety and willingness to recreate, affecting both local users and international visitors who travel specifically for the region's high-quality white-water experiences. He stressed that Queenstown's identity as a destination for pure, drinkable rivers is central to its appeal, and any change would undermine both recreational use and the district's tourism brand. If the discharge proceeds, Huw stated that river users would expect strong accountability measures, including prosecutions for breaches, meaningful penalties, and long-term solutions rather than short-term fixes. He also suggested compensation mechanisms for lost recreational value, referencing the precedent of mitigation works following the Clyde Dam. He emphasised that without consequences, "rules are only as good as their enforcement."

Additional recreation interests in the area include the Queenstown Wild School, MotoX/dirt bikers, jet boating, and other commercial operators. Huw concluded that the consequences extend beyond recreation alone, affecting commercial operators, employment, and Queenstown's broader commitment to regenerative tourism. He expressed concern that approving the discharge would signal that outdoor recreation and environmental integrity "don't matter," contradicting the district's sustainability messaging.

### **Steve Norton, Queenstown Kayak Club President, and Owner/Operator: Around the Basin Bike Hire**

Steve described a high level of recreational use for the Queenstown Kayak Club across the Kimi-ākau/Shotover River, Kawarau River, and Shotover Delta, with activities including paddling, kayaking, packrafting, and as an owner/operator of Around the Basin Bike Hire, cycle-based recreation linked to the wider Great Ride and trail network. For cycle-based recreation regular use occurs along the Kawarau River (including the stretch to Smiths Falls) and the Shotover River from Edith Cavell Bridge through to the delta, with some areas experiencing very high throughput, including more than 25,000 users on the broader trail system. For the kayak club, use is generally higher over the December to April period, with reduced activity through autumn and winter, and no organised competitive events were noted.

Key access points identified include the Edith Cavell/Shotover Jet area and the Shotover-Kawarau Delta, alongside a range of informal entry and exit locations used by paddlers

where conditions are safe and free from hazards. Steve emphasised that access needs are flexible (“malleable”), with users adapting to available conditions rather than requiring unrestricted access everywhere. Some pressure from other river users, particularly jet boats, was noted.

Water quality (visual appearance, smell etc.) was not identified as a primary factor influencing recreational use, with users generally holding an underlying assumption that New Zealand waterways are relatively clean, albeit Steve noted that most club members are aware of the current discharge into the Shotover. Health and safety were considered a more important concern, and no specific feedback or concerns from paddlers regarding current water quality were reported.

Steve indicated it would be unlikely to affect recreation behaviour for members participating in paddling sports, provided the water remains safe. No change in use patterns was anticipated. However, the importance of clear, factual communication was highlighted, including appropriate signage and provision of up-to-date water quality information to support informed decision-making by users.

Additional locations of note included a short river float section near Billys Bridge (at the outlet of Lake Hayes Creek), as well as informal recreation use by residents of the Lake Hayes Estate, who access the river upstream and float short sections downstream, including areas relatively close to the proposed outfall.

#### **Neil Harrison, Owner/Operator: Serious Fun Riverboarding**

Serious Fun River boarding described extensive recreational use of the Kawarau and Shotover Rivers, primarily for river boarding activities that involve participants holding onto boards and swimming through sections of the river in small groups, often “up to 6 groups of 10 a day”. Their main operational areas are outside the proposed discharge area, and are the stretch downstream of the discharge below the Kawarau Bungy Bridge down to Rafters Road, as well as a section above Roaring Meg, with occasional guide training also occurring on the Shotover and other parts of the Kawarau four to five times per year during the September–May season. Access to specific points is essential for their operations, but all fall outside of the discharge area. Neil emphasised that all launch and exit areas are critical for operations; uninterrupted access to these sites is imperative.

Neil highlighted that water quality strongly influences their operations and participation in river boarding because river boarding is a primary-contact recreation, and participants’ willingness to take part is shaped not only by actual safety but also by “how it looks” and public perception of cleanliness.

Neil noted that if the proposed discharge system performs as described (i.e., with no mishaps and no actual health risk) he believes recreation would continue; however, they emphasised that perceived risk is significant, with staff already experiencing discomfort when hearing about the discharge and anticipating that clients may raise concerns. They highlighted that public perception and the potential for misinformation could meaningfully affect participation, even if the treated wastewater meets health standards. Their peak season runs from September to May, making this period particularly sensitive to any changes in water quality or public sentiment. If the discharge proceeds, they want assurances of safety, clear water clarity, and strong transparency

from authorities, including open communication with both the public and commercial operators. No additional locations or issues were raised beyond the need to consider the broader community of recreational users, including swimmers and other river-based groups.

**Shayne Galloway, Whitewater NZ-Nominated Representative**

Whitewater users engage with the Kimi-ākau/Shotover and Kawarau Rivers for a mix of high-grade whitewater activities, including internationally recognised Grade 3–5 runs, pack-rafting, and regular summer social floats. Members frequently paddle through the confluence, use the braided lower Shotover below the bridge, and access the river system via the Delta, although the main paddling areas fall outside the proposed WWTP discharge area. Shayne noted that that the current layout presents some hazards for kayakers and pack-rafters. While key whitewater runs sit outside the immediate discharge zone, the Delta remains an important access point for entering the wider river network.

Shayne noted for members, water quality, particularly the perception of it, strongly shapes participation. Members expressed concern about the proposed discharge, noting that perceived declines in environmental health or safety could deter people from recreating even if the water meets technical standards. Summer is the busiest period, though the rivers are used year-round. If the discharge proceeds, users want protections in place to maintain recreation experience, including safeguarding access, ensuring transparent water-quality information, and minimising any perceived health risk. Overall, Whitewater NZ oppose the discharge into the Kawarau, and also raised concerns about QLDC’s assessment process and emphasised the importance of understanding how cumulative effects may influence both water quality and user confidence.

**Roy Bailey, Board Member: Central Otago Whitewater (COW)**

Members of Central Otago Whitewater (COW) primarily use the upper Kimi-ākau/Shotover River in the Skippers Canyon area and the lower Kawarau River for whitewater kayaking, accessing the river system well downstream of the wastewater treatment plant. Typical use includes paddling from the rafter put-in at the start of the Kawarau Gorge, continuing through key whitewater sections such as Dog Leg, Gentle Annie and Roaring Meg. With around 200 members and a 36-year history, COW relies on established access points shared with rafters, and uninterrupted access remains essential for participation. The club also hosts major events, including national slalom championships on the Roaring Meg and an annual extreme race on Citron Rapid, drawing paddlers from across the country.

Water quality is a significant factor for COW, as Roy noted, kayaking involves unavoidable primary contact. Members already hold a long-standing perception that the water should not be drunk as a precaution, and while no illnesses have been reported, concerns about QLDC’s historic discharges have circulated within the club for years. The proposed treated- wastewater discharge is not expected to deter participation if contaminant levels remain below recommended thresholds and health risks are negligible. Ideally, COW would prefer no discharge at all, but Roy noted that members would continue to use the river if it remains demonstrably safe. The interviewee also noted that any activity upstream, including construction or sediment disturbance, can influence river conditions downstream.

### **Jake Gregory, President: Shotover 4WD Club**

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The Shotover 4WD Club currently consists of approximately 75 members, primarily based in the Queenstown-Lakes District. President Jake confirmed that the club uses the Shotover Delta area primarily for informal summer gatherings, occasional club training days, and general four-wheel-drive recreation. Use of the site is infrequent, with the representative rating it around 2 out of 10 in terms of overall club importance and frequency of use. Most members are based outside Queenstown, and higher-value destinations such as Mace Town and other high-country areas are used far more often.

The club's activities occur entirely on land, not in the river channel. Members do not drive through the Kawarau River, and the proposed outfall location sits in an area they would not normally cross. Their use is concentrated on the gravel flats and beach areas of the Delta. Jake noted they did not anticipate any direct impediment to four-wheel-drive recreation or member experience as the infrastructure would be largely invisible, with only minor terrestrial footprint near the beach.

The critical factor for the club is unrestricted, unimpeded public access to the Delta. They emphasised that continued access via Shotover Delta Road is essential, even though the site is not a high-priority destination. Temporary construction-related restrictions were understood, but any long-term limitation on access would be unacceptable. Potential indirect effects were noted as changes to ground conditions. If the discharge were to create soft spots, low points, or sink-holes where treated wastewater or stagnant water could accumulate, this would deter participation due to safety risks, vehicle hazards, and potential odour or health concerns. These effects, rather than the presence of the outfall itself, would be the only likely cause in use change.

Overall, the Shotover 4WD Club view the Delta as a low-priority destination but still valued informal recreation area. The club supports continued use of the site provided that access remains unrestricted and ground conditions are not degraded by treated wastewater accumulation or stagnant water.